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Subscription Rates  
UNITED STATES AND POSSESSIONS  
One Year, 50 cents. Three Years, \$1.00  
Foreign, \$1.00 per Year

Entered as second-class matter Oct. 17, 1917, at Post  
Office at Chicago, Ill., under the Act of March 3, 1879

Vol. XLIV.

The National Fruit Magazine of America

# AMERICAN FRUIT GROWER MAGAZINE

(Title Registered in United States Patent Office.)

Member of the Audit Bureau of Circulations

PUBLISHED MONTHLY BY  
MAGAZINES, Inc., 53 West Jackson Blvd., Chicago, Ill.

HARRY W. WALKER, General Manager

ADVERTISING REPRESENTATIVES  
Western Manager J. C. BILLINGSLEA,  
1119 Advertising Bldg.,  
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Advertising Rates  
\$1.75 an Agate Line Flat, or \$24.50 per inch  
Classified, 15c a Word

No. 5.

MAY, 1924.

## Soil Management of Peach Orchards

by B. S. Pickett  
Iowa State College

THERE is a particular satisfaction in furnishing good growing conditions for those crops that are reasonably sure to respond to good treatment. The peach is a crop of this kind. Peach trees respond wonderfully to kindly soil treatment and are equally sensitive to neglect. Maximum yields for peach trees are enormous and the increases resulting from correct culture as compared with mediocre culture are very large. There is no comparison whatever between neglect and good care, for neglect means no salable crop whatever, while ideal culture in mature peach orchards results in yields of six and seven hundred bushels per acre in favorable seasons.

In experiments in Illinois the writer secured increases in yield in a four-year-old peach orchard of 239 bushels per acre, not in comparison with neglected plots but over well cultivated plots, by fertilizing with stable manure and other fertilizers. Other experimenters have met with like responses in the direction of increased yields and the number of peach growers who could furnish similar examples from their own experience is legion.

The sensitiveness of the peach to favorable and unfavorable soil treatments can probably be attributed to such characteristics of the tree and its crop as its surprising ability to grow fast when young, its early bearing propensities, its enormous productiveness under favorable conditions and a large but comparatively shallow root system. The annual plant nutrient requirements of an acre of bearing peaches, 75 to 108 trees, in full crop, are 68 pounds nitrogen, 54 pounds potassium, six and one-half pounds phosphorus, and 75 pounds calcium (lime), and it would require approxi-

mately 1500 tons of soil water to transport these elements from the soil to the leaves where the plant could utilize them for the manufacture of the organic substances necessary for its growth and fruit production.

It is a poor soil that does not contain enough to meet the above requirements and only in arid sections is there not enough rainfall to supply the moisture needed. On the other hand, it is a rare soil and a rare combination of good cultivation and management that supplies enough nitrogen, phosphorus, potassium and calcium in the form of soluble compounds, which the roots can absorb, at exactly the time of the year when the trees need them most, and have enough moisture ready to do the carrying at precisely the same moment.

Most of the nitrogen in the soil is in the proteids in the decaying organic matter. Various kinds of bacilli reconvert it into the soluble salts which the plant roots can absorb. The process is best performed in the warm temperatures of late spring and summer, and it requires air, moderate moisture and the presence of a "base" such as calcium to effect the change. The nitrogen salts which the plants use are quite soluble and largely leach away from the soil during winter and early spring. When growth is starting in April and the first part of May, at the very moment when the trees could use quite a lot of extra nitrogen to advantage, there is not much available; and often in late summer when it would be a good thing to withhold this element, it is set free most rapidly.

Potassium, although not dependent on bacterial action for release and actually present in very large quantities in most soils, is usually found in a very insoluble condition. It appears to be released in the presence of a plentiful supply of organic matter, and is rendered more available by the action of certain fertilizers. Quite small quantities of potassium fertilizers themselves sometimes have this very effect.

The peach crop uses very small amounts of phosphorus, but if the trees fail to secure enough in one season, their production will fall short of what it should be, regardless of the total quantity in the soil.

As with the plant nutrients, so may it also be with the moisture supply. Every commercial peach orchardist of the east and middle west has experienced a crimp in his pocketbook as the result of a cut in his crop due to severe summer droughts. The peach districts of Michigan, New York, Ohio, New Jersey, Georgia, Illinois and the Virginias receive an annual rainfall far in excess of the needs of the crop, but if the moisture is not in the soil during the six weeks preceding maturity, the crop is disappointing.

Successful soil treatment for a peach orchard will depend, therefore, upon the skill of the orchardist in coordinating the operations which will supply the trees with the necessary plant nutrients when they need them in quantities sufficient to give a maximum effect on yield. The common means by which this is accomplished are cultivation, drainage and fertilizing.

The effects of cultivation on the release of plant food and the preservation of soil moisture are too well known to call for an extended discussion here; and there follows later in this article detailed directions for the cultivation of both young and old peach orchards. There remains only to emphasize at this point the universal success of cultivation as a system of orchard management for peaches. Even in soils liable to erosion, as much cultivation as practicable should be included in the general plan of management.

### Drainage an Absolute Necessity.

Drainage of the surface soil is an absolute necessity in peach orchards and good drainage to a considerable depth is a decided advantage. The theories underlying the advantages of proper drainage are complicated and, like those underlying cultivation, do not require detailed discussion in this article. Briefly, drainage provides a larger body of earth through which the roots of the trees may forage. By the same token, it automatically increases the total supply of plant food, and it adds to the power of the soil to hold capillary moisture, the kind the trees want.

Good drainage should be supplied by choosing a site for the orchard where the natural drainage is good and by tiling and ditching to remove the water from any wet spots within the general area. Rarely it is necessary to locate a peach orchard on a poorly drained area for some local reason, and it then becomes absolutely necessary to provide a complete system of ditching and under drainage. Neither good tillage nor fertilization will make a success of a badly drained peach orchard.

(Continued on page 18.)



Photo courtesy University of Illinois.

Summer cultivation is the basis of successful soil management of a peach orchard.

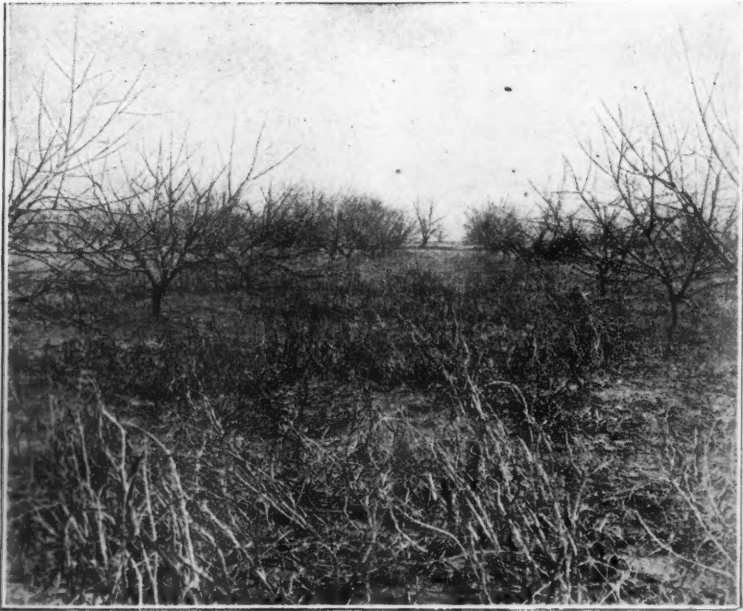


Photo courtesy University of Illinois.

A cover crop supplies humus and prevents soil washing. Even cow peas hold the soil well in spite of being killed by fall frosts.

# "Spurring" Your Cherry Tree to Action

by Hazel Hankinson

**A** LONG with the rest of the scientists who are making wonderful discoveries nowadays come those with plans and specifications for "better cherry trees." This is not only of vital interest to the man who owns 40 acres or so of orchard, it is good news to every city fellow who would like to know how to grow more and better cherries on that one little tree in his backyard. The discovery of a system, therefore, whereby perhaps two luscious red cherries can be grown where there was only one before, has money value. Besides, it appeals to that love of the mysterious which exists somewhere within every man and woman and child.

## The Spur Fruiting System

It all hinges upon what is called the "spur fruiting system," according to scientists who have been working on cherry tree problems for several years; that is, we are to help the whole tree to develop more of what are called "spurs" in the first place, and then Mother Nature takes care of the blossom and fruiting end of the matter in her own delightful way.

Now when your cherry tree, perhaps five years old or more, "comes to life" in the springtime, two kinds of buds are unfolded along whatever new growth has taken place on the branches the year before. One of these is a "leaf" bud; the other is a blossom, or "fruit" bud. The leaf bud starts immediately to grow a new twig, or "spur," which the next year will be either a twig or a branch. The blossom bud begins at once to blossom and the cherries to form.

It would seem, then, upon the face of it, that the aim should be to develop all blossom buds.

"Not so," says the scientist. "To

be sure, if a branch has grown less than six inches in a year's time, almost all the buds on that new growth will be blossom buds, and there will be cherries. On the other hand, longer growths, from 10 to 16 inches, will have mostly all leaf buds—"

"What nonsense, then!" exclaims the Impatient One who wants his cherry pie right away. "What's the use of growing only branches when it's fruit we're after!"

"Wait," says the scientist.

That little six-inch growth has produced blossoms and a few cherries, and its work is done forever. When blossom time comes the second year, however, it is found that the longer growth which the year before produced spurs only is now covered with blossoms. Some of its spur-children, moreover, which have dutifully grown to 10 or 15 inches in length have "leaf" buds to make new spurs,

and in another year's time they will be producing blossoms and fruit as the mother branch is now doing.

He, therefore, who would produce cherries by the "spur fruiting system" must have patience at first. But, it is being proved, after the second year of the system come "the spoils," and these keep on coming with the growth of new spurs each year.

Helping the branches of a tree to put on as much growth as possible up to 16 inches or so in a season then, is part of the secret of success in this system of cherry producing. The trees must be kept growing healthily and vigorously in the lowest branches as well as in the highest.

The common belief has been that cherry trees, like Topsy, should "jes grow" with little or no training at all. Abundant fertilizing has often been thought sufficient treatment to provide the necessary growth and to bring about good yields. But here again the scientists have exploded some pet theories of ours. Fertilizing without pruning, they declare, makes tall trees but it does not necessarily increase the cherry crop.

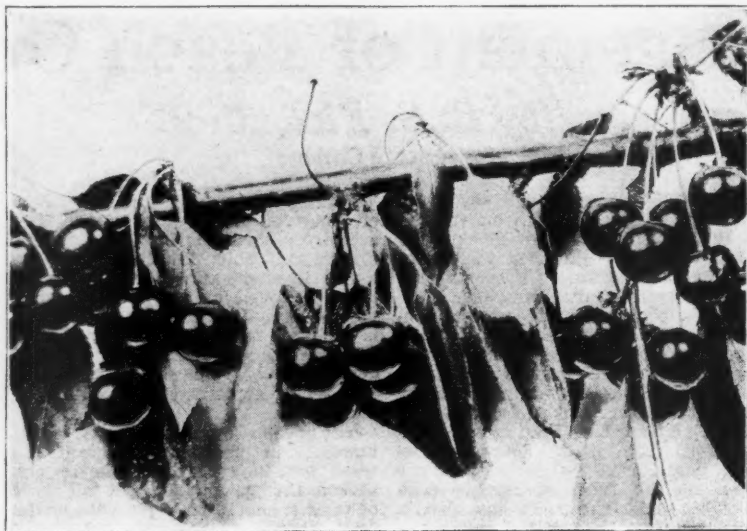
## Prune Tops of Trees Heavily

Pruning the top of the tree quite heavily to keep it open instead of dense has been found beneficial because it allows the sunlight to get at the lower branches. Spurs will not grow if they are shaded by the upper branches, and these lower shaded branches are in time sure to die, with the loss of much surface which might be producing fruit.

"But," someone says, "the very top of the tree is where the best cherries grow!"

It is better to remove the topmost

(Continued on page 16.)



These cherries were formed on a tree which made long growths. The first year the growths produced mostly spurs; the second year, abundant fruit.

# Hail, the Avocado

by Hamilton M. Wright

**T**HANKS to the United States Bureau of Plant Introduction at Miami, people in that section are gaining a new insight into the commercial possibilities and gastronomic delights of that delicious combination of fruit and vegetable, the avocado, or alligator pear.

It is not that the avocado was not known before. It was. It has been grown in southern Florida for more than 20 years. But growers generally did not realize the many varieties of the fruit, the delicious flavors, nor the high prices that could be obtained through intelligent marketing. In 1917, Wilson Popenoe went to Guatemala to introduce the avocado more completely into the United States. The results of his studies were published by the United States Department of Agriculture. Then fruit growers began to gain a vision of the future for the wonderful fruit (and food) which reaches a pound or more and may run up to five pounds. Like citrus fruits which include oranges, lemons, grapefruit and other members of the family, the avocado is now known to be a fruit of infinite variety. There are types for almost every semi-tropical (and tropical) soil and climate. There are varieties which have been known to withstand freezing temperatures, even ice and snow.

So promising seems the future of this fruit that recently Mayor E. C. Romph of Miami proclaimed September first as Avocado Day, and hereafter the first of September each year will be known as Avocado Day, for it is believed by many that the avocado may become as popular as another fruit introduced into the United States, the raisin grape.

The avocado is shaped like a big pear, in fact, the fruit of the avocado tree is known as the "pear." In Guatemala it is the main diet of thousands of Indians. In Hawaii it is greatly esteemed by tourists, and is also much sought after by visitors in the Philippines and the Straits Settlements. It

would be hard to describe the flavor. It is rich and nutty, with a little suggestion of a combination of the musk melon and the peach. Moreover, there are so many varieties that no one description will cover them all.

The avocado pear is very rich in

protein. It contains from 10 to 30 per cent of vegetable fat, which is easily digestible and renders it highly nutritive as a food. Indeed, it ranks with milk, meat and eggs in nutritious properties, and is said to contain more food for the average price at



A sample cluster of Miami's delicious avocados, noted for their great food value.

which it is sold than any other article now sold for food, with the exception of milk. The rich, nutty flavor and buttery texture make it a table delicacy hard to equal. The inside texture is much like that of a firm musk melon, although the color varies with the different varieties. To my notion, when served with a little salt and pepper, the avocado is the most delicious of all fruits. I was first introduced to the avocado at the Bay View Hotel in Manila, in the Days of the Empire. There wasn't much available then in the way of fresh fruits, but I rapidly acquired the avocado habit. It gave one the stimulus to stand up under a hard day's work without the questionable eating of meat in the tropics. It has none of the fibre of meat, and there were, moreover, no ice boxes in the islands in those days. But at that time an avocado was an avocado, and that was all there was to it. People had little idea of the almost innumerable existing varieties of the fruit and of the many variations that could be produced by cross-breeding.

## New Types Being Developed by Miami Station

A wonderful work of experimentation in avocados and in the development of new types of this fruit is being carried on by the Miami branch of the United States Bureau of Plant Introduction. Few people know of the great number of fruits, trees, grasses and shrubs of commercial value that are being introduced from foreign countries and made adaptable to the United States. This station introduced the Kaffir grass from South Africa, a very fine herbage which grows waist high and thrives on the sandy wastes of Florida in spots not well adapted to other pasturage. Mr. Simonds, director of the Miami branch, is carrying on experiments to develop species of avocados to meet every imaginable demand of the market. He

(Concluded on page 10.)



# The Inside Story of the Apple

## Part IV.—The Setting of the Fruit

by J. R. Magness

United States Department of Agriculture

**T**HE SECOND critical period through which the prospective apple crop must pass is that period from the time the apple blossoms open, or even before, until the petals fall. During this period the processes must go on which determine to a very large extent whether the blossoms will stick on the tree and form fruit, or whether they are destined to fall.

The time and conditions under which fruit buds are first formed have been discussed in previous articles. The terminal or central blossom in the cluster is first formed, followed later by the other blossoms. These later blossoms are arranged in a spiral in the bud, and those at the outside of the cluster—or at the base of the spiral—are the last to form in the summer. These blossoms are also the last to open in the spring.

After fruit bud formation, the flowers develop slowly in the bud, during the late summer and early winter. In regions of mild winters, there is apparently some development of the flower parts, even in mid-winter. This apparently occurs in such districts as Virginia, Oregon and other sections having mild winter weather. In those districts having severe winter temperatures, there appears to be very little growth in the flower parts during this period.

The conditions of nutrition within the tree during the late summer and winter are of great importance in determining the vigor of the blossom buds, and the probability of their setting. The number of blossoms per cluster, the size of the individual blossoms and the probability of their setting fruit are directly associated with the food material available for their nutrition. If trees are largely defoliated after the fruit buds are formed, only one to three or four blossoms per cluster will develop, instead of the six to eight blossoms in a normal cluster, and these blossoms will be small in size. Only in rare cases will many of them set fruit. Likewise, a very heavy crop of fruit, which is drawing heavily upon the food materials formed in the leaves of the tree, will tend to reduce the number of blossoms per cluster, the size of the blossoms and the chances of the blossoms which are formed setting fruit. It was mentioned in the discussion on alternate bearing that thinning the apple crop will not result in fruit bud formation the same season that the thinning is done, but it appears probable that it will result in stronger buds, and a larger set of fruit on the buds that are formed, than would be the case with unthinned trees.

With the advent of warm weather in the spring, the buds develop with great rapidity. The individual buds quickly separate out, and within a comparatively short time the blossoms have opened. It is then that the processes of pollination and fertilization must go on, if a fruit crop is to be secured.

### Parts of the Apple Blossom

The apple blossom consists of several parts whose function varies widely. A knowledge of these parts is essential to a real understanding of the processes of pollination and fertilization.

Beginning at the outside of the blossom are the five green, pointed bracts, or sepals, which are not directly concerned in the fertilization of the flowers. Next inside the sepals occurs the five white or pink petals, which also are not concerned directly in fertilization. They are large and showy, however, and are supposed to attract bees and other insects which are of great importance in the carrying of pollen.

Within the whorl of petals occurs the stamens, or small yellow organs in which the pollen is produced. The upper and enlarged parts of the stamens, termed the anther, is the chamber in which the pollen is produced. When the pollen grains are mature, and when the blossom becomes dry,

these anthers split and allow the pollen to escape.

At the center of the clusters occurs the pistil. This small structure, when carefully examined, is very complex. At the top is an enlarged portion, termed the stigma, which in the open blossom is covered with a sticky excretion. The stigma is connected with the base of the pistil by a slender stem, termed the style. The base of the pistil is enlarged, and is divided into five segments. In each of these a small opening occurs, which is the forerunner of the seed cavity of the mature apple. Within the small cavities are the forerunners of the seeds—or the ovules.

### The Process of Fertilization

The pollen grain, which to the unaided eye appears as a very fine speck of yellow dust, contains the male element or germ of the plant. This is carried from the anther, where it is formed, to the stigma, or sticky surface at the top of the pistil. Insects, especially bees, are the main agents for carrying pollen in apples.

Once on the stigma, the pollen grain quickly shows that it is a living structure. A fine tube begins to push out from one side. This tube pushes into the stigma and rapidly grows down through the style to the base of the pistil, or the ovary. Here it reaches the small ovule which is the forerunner of the seed. Two very small structures, termed germ cells, are formed in the pollen tubes, and these pass into the embryo seed. Here one of them combines with the egg cell present in this structure. From the cell resulting from this combination, the embryo, or miniature plant contained in the seed, develops.

### Necessity for Fertilization

Fertilization, or the combination of the cell from the pollen with the egg cell in the pistil, is essential to the formation of seeds that are capable of growth, in most plants. This is particularly true for apples—seeds will not develop without fertilization. And it is only occasionally that fruits will develop normally and remain on the tree until mature without seeds. Occasionally seedless apples are found, but in most cases they are misshapen and generally fall when immature. From a practical viewpoint, it may be said that fertilization is essential to seed formation, and that seed formation is essential to the proper setting and development of the fruit.

### Cross Pollination in Apples

With many varieties of apples, it is not sufficient that pollen be deposited upon the stigmas of the pistils in order to secure a set of fruit. In a great many varieties, it is essential that the pollen be that from some other variety than the variety producing the pistil. Such varieties are said to be self sterile, meaning that their own pollen will not serve to fertilize them and that pollen of other varieties must be available if a set of fruit is to be secured.

Experimental work has shown that a majority of our apple varieties are self sterile. Under adverse conditions, it seems probable that all varieties of apples are benefited by cross pollination. While certain varieties, under certain conditions of growth and vigor, will set a full crop when pollinated with their own pollen, these same varieties will usually set a larger crop when cross pollinated. This is particularly true if the trees are low in vigor, or if the blossoming season is unfavorable for pollination to occur.

Fortunately, most all varieties of apples are inter-fertile. In many fruits, particularly among the stone fruits

and grapes, certain varieties are inter-sterile, and the pollen of one variety will not fertilize the blossoms of certain other varieties. Some experimental work has indicated that certain varieties of the Winesap group (Arkansas Winesap, Staymen Winesap, Arkansas Black and Kinnard) might be inter-sterile, but this has not been definitely established. Almost all varieties of apples appear to be inter-fertile. The primary consideration, therefore, in selecting varieties of apples for cross pollination is to secure varieties of approximately the same blooming season. Aside from this, commercial considerations of desirable varieties to plant determine the varieties.

### Influence of Weather Conditions Upon Fertilization

Much has been written concerning the influence of weather conditions upon fruit setting. It is important only to review it very briefly in this connection. The fact has been mentioned that insects, particularly bees, are the principal agents in pollinating fruits. Bees do not work to an appreciable extent during rainy weather, or while the weather is cold. Consequently little pollen will be carried during cold or rainy weather. The fact should also be mentioned that the pollen containers, or anthers, do not open during wet weather, so even if insects were working, little pollen would be available for distribution.

Pollen can be germinated artificially in the laboratory by placing the pollen grains in sugar solution. Under these conditions a temperature of above 40 degrees Fahrenheit is essential for the growth of the pollen tubes of apples. Even above 40 degrees, the growth is very slow unless the temperature is raised to 60 to 75 degrees Fahrenheit. It is probable that similar conditions prevail in the orchard and that long periods of cold weather, even if well above the actual freezing point of the blossoms, will interfere with the fertilization process.

It is thus apparent that warm, dry days are ideal from the standpoint of the set of fruit. Days of high insect activity, with temperatures sufficiently high for rapid growth of the pollen tubes are particularly desirable. Emphasis should again be made of the importance of the vigor of the trees and of the individual blossoms in surviving unfavorable weather conditions at blossoming time. It has been observed many times that when unfavorable conditions, such as frost, rains, or continued cold weather, occur at blossoming time, those trees which are well nourished and are making a good growth—which during the preceding season had an abundant leaf area and did not overbear, and which produce strong, large blossom clusters—are the ones on which the most fruit sets. These blossoms apparently are more resistant to unfavorable conditions and will set fruit when less vigorous blossom clusters fail.

### The Dropping of Fertilized Fruits

It should not be inferred from the above discussion that fertilization insures the development of a mature fruit from a blossom. It would be most unfortunate from the commercial grower's point of view if this was the case. During seasons of a full bloom, many times more blossoms are produced upon a tree than the possible or desirable number of fruits. This may be emphasized by considering a single blossom cluster. Six to ten blossoms are not unusual, yet generally only one fruit sets, with two setting rather often and three setting occasionally. Yet it is certainly true that all the flowers of a cluster are in many cases

pollinated, and probably fertilized. It appears that when fertilization occurs among the blossoms of a cluster, a struggle is set up among these closely competing blossoms or young fruits for the food supply from the adjacent leaves. The strongest, or most favorably situated, survive; the remainder drop off.

As in the individual cluster, so to a considerable extent the competition for food material extends through the tree as a whole. If the food materials of the tree are depleted, due to heavy bearing the year before, many of the blossoms, even if fertilized, will not survive. On the other hand, if the year before has been non-fruitful, conditions of nutrition in the tree will be favorable to a large set of fruit. Thus it appears that conditions of nutrition in the tree are of great importance in determining set of fruit. Pollination and fertilization appear to be essential to the setting of the fruit, but they are not the sole determinant of whether or not the fruit will remain on the tree until mature. We do not know exactly how the conditions of nutrition within the tree act to cause the fall of the blossoms or young fruits, but the fact of an intimate relation between the two seems well established.

Such evidence as is now available indicates that an abundance of nitrogen is favorable to the retaining of the young fruit on the tree. Chemical analyses have shown that the young fruits or blossoms that drop off are very low in nitrogen content. It has also been shown repeatedly under orchard conditions that applications of nitrogenous fertilizers, particularly if they are quickly available and made some time in advance of blossoming time, will greatly increase the fruit setting in orchards in sod or otherwise low in nitrogen. We do not know to what extent nitrogen entering the blossoms acts directly to prevent their fall, or to what extent the result is due to the stimulation of leaf growth and food manufacture. But the fact appears established that fairly abundant nitrogen in the trees at blossoming time is conducive to a heavy set of fruit.

### Frost at Blossoming Time

The nightmare of the fruit grower in many sections of the United States is the spring frost or freeze, coming at blossoming time or immediately thereafter. This will not be discussed in any detail, but since it is such a great factor in the production of an apple crop, it must be mentioned briefly in passing.

The danger point for apples when in the bud, but showing color, has been given by most students of the problem at 25 to 27 degrees Fahrenheit. In full blossom, 28 to 29 degrees Fahrenheit represents the danger line, while similar temperatures spell danger following the petal fall.

The only way to entirely prevent injury to the blossoms when temperatures below these points are prevailing is to prevent the temperature in the orchard from falling below the danger point. This can be accomplished under certain conditions by orchard heating.

Such injury is due to the formation of ice in the blossom tissues, and results in an actual killing of the tissue. The resistance of individual blossoms varies widely, however, and only under exceptionally cold weather and prolonged exposure is the crop entirely destroyed. Again, it apparently is the blossoms on strong, vigorous trees that to the greatest extent escape destruction. One of the best forms of crop insurance that the orchardist can carry, for safety both against frost and against adverse weather conditions, is to have his trees in a thrifty, vigorous condition, with the formation of strong buds and blossom clusters that will result from this.

Next month, we will trace the development of the apple, from the time of setting until ready for picking.



# Our Editorial Comment

## Advisory Board of Contributing Editors

IN THIS issue we are adding a feature which we believe is a long step forward in the progress of the magazine and one which, in our opinion, will mean a great deal to every reader as time advances. We are announcing the personnel of an Advisory Board, consisting of a number of the very best horticulturists of the country.

This board consists of:

M. J. Dorsey, Head, Department of Horticulture, West Virginia University, Morgantown, W. Va.

C. D. Matthews, State Horticulturist, Raleigh, N. C.

J. C. Blair, Head of Department of Horticulture, Urbana, Ill.

W. H. Alderman, Chief, Division of Horticulture, University of Minnesota, St. Paul, Minn.

U. P. Hedrick, Vice-Director, New York State Agricultural Experiment Station, Geneva, N. Y.

S. W. Fletcher, Professor of Horticulture, Pennsylvania State College, State College, Pa.

J. H. Gourley, Chief in Horticulture, Ohio Agricultural Experiment Station, Wooster, Ohio.

F. C. Sears, Department of Pomology, Massachusetts Agricultural College, Amherst, Mass.

W. C. O'Kane, Durham, N. H.

J. R. Cooper, Head, Department of Horticulture, University of Arkansas, Fayetteville, Ark.

W. L. Floyd, Head of Department, Botany and Horticulture, College of Agriculture, Gainesville, Fla.

W. P. Tufts, Assistant Professor in Pomology, University of California, Davis, Calif.

O. F. E. Winberg, President, Gulf Coast Horticultural Society, Silverhill, Ala.

It is the object of the magazine to serve the growers of all the different kinds of fruit in all of the important fruit sections of the country. With this end in mind, it seemed to us that a board of leading horticulturists, selected with the idea of representing the different kinds of fruits as well as the different fruit sections, could be of a lot of service in helping to maintain the magazine at a high standard. They can help us by contributing special articles. They can advise us of the problems in their sections and the kind of articles that will be of most service to their growers. They can keep us informed as to the investigations in progress in their sections and the men best qualified to contribute articles on important subjects. In short, they can help us in many ways to make the magazine most serviceable.

We feel optimistic indeed about the standing of the men who are serving on this board. Each of them is a leader in his section and a man whose opinion carries weight on fruit growing matters. We are pleased to state that no refusals were received in the selection of this board, and we believe we may take this as evidence that these men regard the magazine as being what we have been trying and will continue to try to make it, namely, the leading and most authoritative source of contact in the country between the scientific horticultural workers and the practical fruit growers.

We desire to add, in justice to the many other excellent college and station horticulturists, that we do not consider that we selected all of the best men to serve on this board, for there are numerous other well qualified men. We simply selected leading horticulturists for

the different sections and branches. It is realized that not all sections are definitely represented, but we had to stop somewhere, as the board could not be unduly large. It may be necessary to add more representatives in the future.

We hope that our readers will feel free to let the representative nearest them know their views about the magazine, and the ways in which it can be of the greatest service to them.

## A New Co-operative Association

WHILE it is against the rules and editorial policy of this publication to give out information which is supposed to be of a confidential nature, we really believe the following letter received from one of our subscribers is of such a constructive type that it can be taken as a splendid example for other fruit growers who are contemplating the formation of a co-operative association:

AMERICAN FRUIT GROWER MAGAZINE,  
Chicago, Ill.

Gentlemen:

I have been a subscriber to your magazine for several years and lately have become much interested in your department, "With the Co-ops."

The grape growers of Yakima Valley, Wash., have been working for the past few months to perfect a co-operative association. We have incorporated under the Farm Marketing act of the State of Washington a non-profit, non-stock association, known as the Yakima Valley Grape Growers' Union. E. V. Wyant is president; R. R. Wardall, vice-president; Thomas R. Robinson, secretary-treasurer and manager; all of Grandview, Wash.

It is the purpose of this organization to endeavor to eliminate waste and speculation and to stabilize the markets as far as possible for our products. The Yakima Valley is fast becoming one of the leading grape producing sections in the west and the increased acreage planted the past few years will soon make it necessary to market approximately three to five hundred cars of grapes in the northwest. In order to do this, it is essential that the producers get together and build up their natural markets, which comprise Montana, Idaho, Washington and parts of Wyoming and Oregon. While this territory seems rather large, yet the population is not dense and it makes it necessary to spread our shipments over quite a large area in order to reach the ultimate consumer. The principal varieties are Concord, about 90 per cent, Early Campbell and Moore's Early and Wordens making up the balance.

The standard package used is the six-pound basket. An effort is being made to build up a market for a considerable tonnage in what is known as the Los Angeles Lug, which contains about 25 pounds net of grapes.

The territory coming into this Union this year extends from Benton City, Prosser, Grandview, Sunnyside, Outlook and Granger. It is hoped in another year to take in all the points in the Yakima Valley which ship grapes. An active campaign is now being waged to sign up at least 75 per cent of the tonnage. The district around Grandview has already signed up 90 per cent and this is the heaviest shipping point in the valley.

I would appreciate from your department a list of the names of the various co-operative grape associations throughout the country, with their addresses, so that we might write to them and secure copies of their contracts, grading rules, inspection methods, etc., for our guidance in trying to operate from the start in a successful manner and to avoid as far as possible some of the mistakes others have made in their first few years of operation.

Thanking you for any information you can give me, I remain

Yours truly,

THOS. R. ROBINSON,  
Manager.

Yakima Valley Grape Growers' Union.

Will the various grape associations send to the new organization such information as is consistent with the policy of their association

to assist in making this association a splendid success from the inception?

## The Question of Root Stocks

IN RECENT numbers we have included two articles by Prof. Heppner of California on the question of root stocks for fruit trees. These articles are particularly valuable for information regarding the species and sources of seeds and seedlings used for propagating our common fruit trees. We suggest that you get out your back numbers and thoroughly familiarize yourself with these articles.

In 1900 an important plant breeding law, which had been forgotten or regarded as unimportant since 1865, was rediscovered by three European scientists. With the help of this law, scientists have accumulated in the past 10 or 15 years an enormous amount of information about inheritance in plants and animals. This new understanding has placed an entirely new aspect on the question of root stocks. We see now that there is involved in this matter considerations which we did not appreciate before. We are beginning to understand for the first time the fundamental principles involved, and we can now see why so much difference exists in the trees of a given variety in the same orchard under apparently the same soil, moisture and cultural conditions. Knowing the principles involved, it appears that certain methods can be used by nurserymen and other plant propagators which will give us immediate results. The way is laid open also for investigations which may enable us to secure in time still greater uniformity and quality in our trees.

In this issue we are presenting another article on the subject by Dr. Karl Sax of the Maine Agricultural Station. Those who know of Dr. Sax's standing and work in the field of plant breeding will not need to be urged to carefully read his article. Dr. Sax has recently given especial attention to the question of root stocks and some of the ideas expressed in his article are original with him and have been "on the market" only a comparatively short time, even in the most scientific circles.

In presenting this article, and others on the subject which will follow, we feel the magazine is giving to its readers some brand new and thoroughly trustworthy information on a subject which strikes at the very heart of successful orcharding, and we hope every reader will study and consider these articles most carefully.

## Editorial Co-operation

WE ARE exceedingly anxious and are doing our best to have every article published in the American Fruit Grower Magazine of special interest to our readers. We want to cover subjects that appeal to you. In our efforts to improve our editorial columns, we recently sent some of our readers a list of questions and the response has been very gratifying.

One of our questions was, "Do our editorial columns cover subjects you are interested in?" Another was, "Have you any suggestions to make that will help us improve the American Fruit Grower Magazine?" To the first question the general answer was "yes," and in replying to the second question, about 75 per cent stated they had no suggestions to make. The other 25 per cent mentioned various subjects, and it is our plan to cover the more important ones in early issues.

If you have any suggestions to make from time to time, tell us about them and we will continue to give you a real live fruit paper full of timely advice.



# Effect of Root Stocks on Growth of Apple Tree

by Karl Sax

Maine Agricultural Experiment Station

THE COMMERCIAL apple varieties of today are the superior individuals selected from perhaps millions of seedlings. Only these few superior types are considered worthy of propagation. But in selecting root stocks on which to graft these superior varieties, almost any seedling is considered good enough for a root system. Most commercial apple trees in this country are propagated on French Crab seedlings. These trees are extremely variable and if several thousand were grown to maturity, hardly any two would be alike, and hundreds of distinct types would be found in respect to size, season of maturity, leaf shape and quality of fruit.

Seedling apple trees are extremely variable even if they are from a single horticultural variety. In a seedling orchard planted in 1911 at the experimental farm of the Maine Agricultural Experiment Station, the trees varied in trunk girth from one to seven inches in 1922. These trees were all of the same age and for the most part were from standard commercial varieties grown in Maine. One has only to observe the natural trees so abundant in New England to realize the great variability that may exist in seedling trees in respect to size, vigor, type of growth, season of maturity and adaptability to certain types of soil. It is only reasonable to suppose that buds or scions grafted on such seedlings would also vary greatly in subsequent growth and yield.

## The Effect of the Root Stock on the Mature Trees

It is well known that certain stocks, such as the Paradise and the Doucin and other dwarfing stocks, make a comparatively small tree which bears early, while most French Crab or standard stocks result in a large tree which comes into bearing relatively late. Hatten has found that certain types of "standard" stocks may also affect the vigor of the tree so that a variety which is naturally large can be dwarfed when worked on such a stock. Other types of stock make a shallow-rooted tree while others root deeply. Hatten also believes that the color and size of the fruits are affected by the root stocks. There is certainly a great deal of difference in the ability of seedling stocks to resist various diseases, but whether this effect is transmitted to the scion or not is questionable.

## The Effect of Seedling Stocks on Nursery Trees

Several experiments have been conducted at the Maine Agricultural Experiment Station to determine the effect of different sizes of root stocks on the growth of nursery trees. Several thousand American-grown French Crab seedlings were purchased and planted in nursery rows. Although these French Crab seedlings were of No. 1 grade, they varied considerably in size and ranged from four to 15 millimeters in trunk caliper. The seedlings were measured soon after they were set and again at the end of the first summer. They were budded in the summer of 1922 and data on bud development and size of the whip were taken in 1923. Little or no relation was found between the size of the seedlings as they came from the wholesale nursery company and the size of the resulting whip, indicating that in the No. 1 grade at least there is no effect of culling out the smaller trees. After the seedlings had made one season's growth, there was, however, a decided relation between the size of the seedling and the size of the resulting whip the following year. The larger seedlings resulted in a significantly larger whip than did the smaller seedlings. For instance, in one case a group of seedlings which measured 13 millimeters in trunk caliper in the fall of 1922 resulted in whips 50 per cent larger than those grafted on seedlings with a trunk caliper of 10 millimeters. The relation between the size of the seedlings and the size of the resulting whip would

undoubtedly be increased if all grades of seedlings were used.

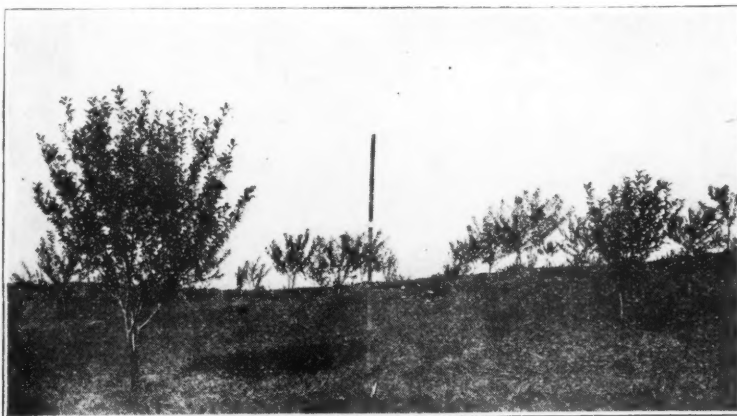
Although there is undoubtedly a decided relation between the size and vigor of the seedling and the size of the resulting whip, there are also other important factors involved. It was found that there was a high relation between the rate at which the bud developed in the spring and the size of the whips in the fall. The grafted buds which started first in the spring produced the largest whips, while the buds which started slowly produced relatively small whips at the end of the first year. The rate of development of the grafted buds was apparently independent of the size and vigor of the seedlings or the rate of development of the seedling itself.

## The Improvement of Root Stocks

At the present time most of the nurserymen use French Crab seed-

and Vermont seed made a better growth than those of the seedlings raised from the French Crab seeds.

Since the French Crab seedlings are from natural or seedling trees they should not be greatly different from the seedlings from the natural trees found in New England and other places in the United States, in fact, there is good reason to suppose that the New England seedlings would give better results because a tree which is hardy enough to survive the severe winters and to thrive in the poor soil of the New England hills would certainly be highly selected as compared with the seedlings grown in the more temperate climate of France. At the present time, experiments are in progress at the Maine Agricultural Experiment Station to test the growth and value of seedlings from "Natural" trees in Maine for stocks for grafting. In a number of cases, seeds have



The two trees in the foreground were both budded on French Crab roots in 1913. Although the two trees have received the same treatment, the one at the left is more than twice as large as the one at the right. Part of the variation in size is attributed to the effect of the variation in vigor of the seedling stocks on which the trees were budded.

lings grown either in France or in this country. Some seedlings from cider mill pomace in Vermont, Minnesota and Virginia are also used. In one case at least the seedlings from commercial varieties of apples are used to a considerable extent. The nurserymen prefer the French Crab seedlings, but it appears that seedlings from other sources will give equally good results. For instance, a nursery company in Washington uses both the French Crab seedlings and seedlings from seed obtained from local cider mills. Since there are comparatively few natural or wild apple trees in the apple growing districts of Washington, the seeds from cider mills must be largely from the leading commercial varieties grown there, namely, the Winesap, Jonathan, Rome Beauty, Delicious, Spitzenberg, etc. This nursery company apparently gets equally good results from seedlings of the commercial varieties as they do from the French Crab seedlings. They state that three-fourths of their one-year-old whips will exceed four feet in height.

Similar results are also found by the United States Department of Agriculture. In certain nursery stock investigations conducted by Mr. Scott, a number of apple seedlings from different sources were grown in 1921. These included imported French Crab, French Crab grown in the United States and American seedlings from different sources, grown in various places in the United States. The American-grown seedlings from American seed gave the most vigorous trees. Certain of these seedlings were also budded with four standard commercial varieties. According to Mr. Scott, all of the varieties budded on the seedlings raised from Minnesota

been obtained from extremely large, vigorous seedlings which have stood the severe winters of Maine for perhaps a hundred years. These will be grown and compared with seeds from commercial varieties and with the usual French Crab seeds as obtained by the wholesale nurseries of this country.

There is no question but that certain horticultural varieties of apples will produce better seedlings than others. Mr. Scott, of the Department of Agriculture, has shown that the seeds from McIntosh and Tolman Sweet trees gave better results than a number of other commercial varieties tried. It is interesting to note that the Tolman Sweet seeds have long been used by amateur nurserymen in New England for growing seedling stocks. Since certain commercial varieties result in better seedlings than others, it is only natural to expect that certain seedling trees will give much better progeny than others. If certain seedlings can be found which will give a very high percentage of vigorous, hardy stocks, well adapted to the climatic conditions of a given vicinity, it would perhaps be practicable to select buds or scions from these superior seedlings and propagate large orchards to be used primarily for a source of seeds for propagating work.

## Propagation by Piece Root Cuttings

Another method of propagating stocks recently developed by Mr. Scott and his associates is to make piece root cuttings. They have found that apple seedlings may be propagated by cuttings simply by taking pieces of the root about three inches long and a fourth of an inch thick and placing vertically in the ground so

that the tip is covered by about an inch of soil. By continued piece root cuttings from an especially desirable type of seedling, ultimately a large number of roots all of the same variety could be obtained. In this way a clonal variety of roots could be established in the same way that horticultural varieties are now maintained. It would only be necessary to maintain a block of trees obtained by piece root cuttings from the best seedlings or varieties for a source of piece roots for grafting.

If any of the present commercial varieties were found to grow well on their own roots, then propagation by piece root cuttings might be practical. For instance, scion-rooted McIntosh trees have been obtained by Shaw in Massachusetts by using a long scion and short seedling piece root. The graft is planted deep and roots develop from the scion. The seedling nurse root is removed and the McIntosh is on its own roots. Since the roots and the tops are alike, the piece root selections will result in McIntosh trees without grafting or budding. For some varieties this method may be of value, but many varieties will probably grow better on selected seedling roots.

Judging from the results Hatten has obtained in England, it is perhaps not too much to predict that the size and vigor of the tree, age of bearing and adaptability to different soil and climatic conditions can be regulated to a considerable extent by the proper selection of propagating stock. The type of root stocks will, of course, vary considerably for different communities. Here in New England a type is desired which has a spreading root system and one which will be adapted to the shallow rocky soil. In the deep fertile soil of the middlewest, an entirely different type of root system is desired. In both New England and the middlewest, hardiness is a very important factor. On the Pacific coast, the most important problem is to find a root stock for stone fruits which will be resistant to oak fungus. Mr. Reimers at the Oregon Station has been successful in isolating pear seedlings which are apparently immune to blight. It is probable then that different types of root systems will be required for different communities for different varieties and perhaps they will also be selected for their effect on habit of growth of the mature trees. Although the whole question of root stocks is still in the experimental stage, it is beginning to receive some of the attention which it has long deserved. It is certainly one of the most important problems of horticulture today.

## Large Nursery Trees Give Best Results

In the meantime, there is little the growers can do but to select the best nursery stock that the nurserymen have to offer. By planting only the best grades and perhaps eliminating the cull trees after the first two years in the orchard, undoubtedly the number of unprofitable trees, in a mature orchard can be reduced. Webber has found in both experimental and commercial orchards in California that large nursery trees after five years in the orchard produced trees about twice as large and productive as the small nursery trees.

Similar results have been obtained at the Maine Agricultural Experiment Station in an apple orchard of several hundred trees including 10 varieties. It was found that the trees which were large the second year in the orchard were relatively large in 1922, six years later, and that the "runts" in 1916 had produced small inferior trees in most cases. In this orchard the soil is uniform, the trees had similar treatment and all buds of each variety were selected from individual trees, thus eliminating any possible differences due to bud selection. The only known variable factor of importance in this case is the effect of dif-

(Concluded on page 21.)



# Why Soils Require Lime

by Robert Stewart

University of Nevada

**A**LTHOUGH various forms of liming materials have been used by farmers for centuries, their use was based entirely upon empirical grounds. Without a full knowledge of soil composition and plant nutrition, there could be no clear conception of the reason for the use of these liming materials and the kinds of soils upon which their use would prove to be profitable.

Some farmers under certain conditions would use lime with very beneficial results, while other farmers under a different set of conditions failed to secure any benefit from the use of liming materials, consequently there were periods during which its abundant use was followed by long periods during which its use was largely discredited. Thus in England in the fifteenth century the use of lime or marl was a common practice in certain sections, while a century later, its use had almost ceased, owing, no doubt, to a mistaken sense of its value and perhaps in part to its use on the wrong types of soils. The use of lime was again revived by the work of Lord Townsend during the seventeenth century.

King reports an interesting case of the actual prohibition of the use of lime by law in Japan. He says, "At several places along our route, from Shimono-ski to Osaka we observed the application of slacked lime to the water of the rice fields, but in this prefecture, Hyogo, where the station is located, its use was prohibited in 1901 except under the direction of the station authorities, where soil was acid or where it was needed on account of insect troubles. Up to this time it had been the custom of the farmers to apply slacked lime at the rate of three to five tons per acre, paying \$4.84 per ton for it. The first restrictive legislation permitted the use of 82 pounds of lime with each 827 pounds of organic manure, but as the farmers persisted in using much larger quantities, complete prohibition was resorted to."

In America, undoubtedly the use of lime and marl was prevalent in isolated sections before the important work of the experiment stations showed the scientific necessity and basis for its use on acid soils.

The term "soil acidity" is applied by agricultural writers and investigators by common consent to a large area of arable land, found particularly in humid climates of high rainfall, although there is a wide divergence of opinion as to the nature and effect of such soil conditions. These soil conditions are easily recognized by the nature of the crops produced under normal conditions and especially by the great difficulty of securing successful stands of many legumes, particularly such as alfalfa, sweet and red clover and also by the wide prevalence of such plants as sorrel.

Acid soils, as is well known, also readily turn blue litmus paper red. While soil acidity may thus be readily recognized by the careful student of soil conditions, it is not so clear as to the cause, nature and economic effect of these soil conditions.

## How Soil Acidity Is Produced

There are a number of factors which contribute to an acid condition of the soil, such as decomposition of soil organic matter derived from applied manure, crop residues such as straw, leaves, stover, cover crops and any other humus producing organic matter, which may be applied to the soil. The decomposition of such organic matter results in the production of acids, thus causing an increased production of total soil acidity, or in the formation of soluble compounds of calcium which are leached from the soil with the resulting decrease in the total available bases of the soil. A clear conception of how soil acidity is produced may be obtained if it is only remembered that this condition occurs primarily in humid climates of high rainfall and must

therefore be necessarily related to the prevailing climatic conditions. The characteristic condition of a humid climate is an abundance of rainfall resulting in excessive leaching of plant food materials from the soil. One of the most easily leached elements of plant food is calcium, the important base in limestone and many soil silicates. Humid soils are, therefore, frequently deficient in usable bases such as calcium and have tendency to soil acidity, while semi-arid soils are, as a rule, well supplied with limestone and are rarely acid.

## Loss of Limestone from Soil in the Drainage Water

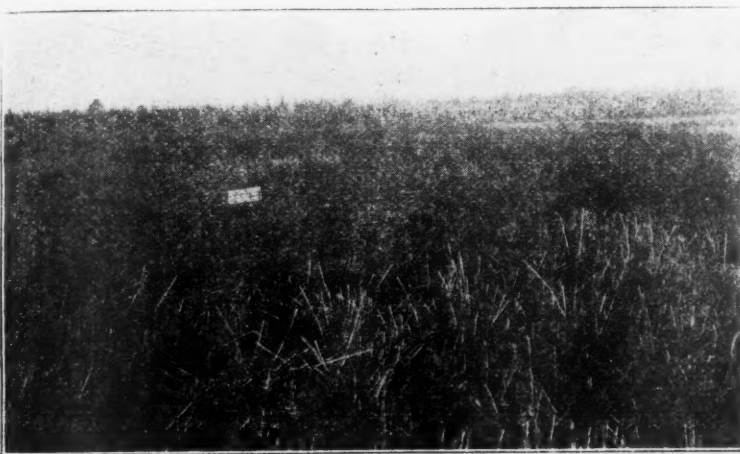
Soil acidity is, therefore, caused primarily by the leaching action of rainfall which removes the calcium compounds from the soil in the drainage water, and this loss is hastened

in the above table, the loss of limestone in the drainage water varied from 11.8 tons from soil receiving barnyard manure to 28.6 tons from the soil receiving ammonium sulphate.

There are a number of other minor factors which contribute to the formation of acid soil, such as the loss of limestone removed in the crop; the effect of certain kinds of soil treatment on the production of soil acid; the effect of decaying vegetation; and the effect of green manure on soil acidity.

## Limestone Removed on the Crop.

Besides the amount of limestone removed from soils by the leaching action of rain water, there are also considerable amounts used by crops, the legumes especially being heavy feeders upon calcium. A four-ton crop of any of the common legumes would remove about 120 to 140 pounds of the element calcium, which would



Limestone treatment on this field produced over one ton of sweet clover for green manure where none would grow before.

by the solvent action of carbonic acid gas, formed in soil by the decomposition of the soil organic matter or humus, which converts the calcium compounds into soluble calcium bicarbonate.

In cultivated and cropped soils, the magnitude of this loss is very great and is well illustrated by the data from the experimental fields at Rothamsted, England. The average annual loss of calcium carbonate or limestone from the Broadbalk and Hass fields, from treated and un-

be equivalent to respectively 300 and 350 pounds of limestone. Definite analysis of alfalfa hay grown in the presence of excessive quantities of limestone have shown it to contain as much as 50 pounds of calcium equivalent to 125 pounds of limestone per ton of hay. The cereals, however, do not require so much calcium as an average, possibly about one-third of this amount.

The amount of calcium and magnesium removed in the produce from one acre is recorded as pounds per acre:

Kind of Crop.	Amount Produced.	Pounds of Calcium.	Pounds of Magnesium.	Equivalent to Pure Limestone.
Wheat .....	50 bu.	1.0	4	18.5
Wheat straw .....	2½ tons	9.5	4	39.8
Corn .....	100 bu.	1.3	7	31.0
Corn stover .....	3 tons	21.0	10	90.0
Oats .....	100 bu.	2.0	4	21.0
Oat straw .....	2½ tons	15.0	7	65.5
Clover seed .....	4 bu.	.5	1	5.0
Clover hay .....	4 tons	117.0	31	416.0
Alfalfa .....	4 tons	114.0	15	345.0

treated soils, is as follows, expressed as pounds per acre:

Soil treatment.	Broadbalk field.	Hass field.
Farm manure .....	590	830
Unmanured .....	800	1,000
Minerals only .....	880	675
Minerals—Ammonium salts .....	1,170	790

It should be remembered that the limestone of these fields was largely of artificial origin and was applied over a century ago and that very excessive applications were made of over 100 tons per acre, applied in the form of chalk. The annual loss of limestone is very large and is of great economic importance. The loss of limestone was also very materially influenced by the soil treatment applied at Rothamsted. During the 40-year period represented by the data

reduced when the ammonium sulphate has been used.

Clover failure was first observed in 1897 on the plot receiving the largest amount of nitrogen and there was a corresponding increase in the growth of sorrel, the plant indicator of acid soil. Ten years later, in 1907, similar results were observed on the plots receiving the medium amount of nitrogen and similar results were observed in 1917 on the plot receiving only 24 pounds of ammonium sulphate. The clover failure has invariably been followed in a few years by reduced yield of corn, wheat and oats. This condition is the direct result of acidity produced by the oxidation products of ammonium sulphate.

## Effect of Decaying Vegetation

When vegetation decays in the soil organic acids are produced and, under certain conditions, they may accumulate in the soil so as to increase very materially its acidity.

It is well known that on newly cleared timber land, unless it is freshly burned over, that crops do not do very well unless they are acid resistant such as rye, buckwheat or potatoes. It may be that the accumulation of acidity, due to the decay of the large amount of organic matter, plays an important part in creating this soil condition. Corville recently estimated the acidity present in a compact layer of freshly fallen leaves, estimated to weigh 500,000 pounds. In terms of lime requirement the amount of acidity produced was as follows:

Kind of leaves.	Acidity. Tons.
White oak .....	25
Red oak .....	16
Silver maple .....	22
Sugar maple .....	22
Tulip trees .....	14
Virginia pine .....	22

These results are of very great importance to the farmer who uses large amounts of organic matter in compost or otherwise.

## The Effect of Green Manure on Production of Soil Acidity

Some interesting results on this phase of the question have recently been reported by White of the Pennsylvania Experiment Station. He used soil from a plot having a very high limestone requirement and mixed it with various kinds of organic matter and made limestone requirement determinations from time to time during a period of nine months. The limestone requirement of the original soil was 4644 pounds. At the end of nine months, when a legume mixture had been added to the soil, the lime requirement had increased to 5273 pounds, and when a non-legume mixture was added, it had increased to 5556 pounds.

## The Nature of Soil Acidity

The phenomena accompanying soil acidity may be due to any one or all of the following causes: First, the presence of free acids; second, a deficiency in usable bases; third, the presence of easily soluble iron or aluminum compounds which are detrimental to plant growth and which can occur in the soil in a harmful form only in the absence of such bases as calcium. The fact that true acids actually occur in acid soils may readily be established by their reaction to litmus paper and also by direct measurement of the concentration of hydrogen by means of the hydrogen electrode.

Evidence that easily soluble aluminum and iron occur in acid soils is plainly established by making a proper extract of such soil. It is true that in acid soils only a small quantity of iron or aluminum may be obtained in pure water, a salt-solution such as potassium or sodium nitrate will readily extract appreciable quantities of iron and aluminum. It must be remembered also that the soil solution

(Concluded on page 14.)



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has hard work handling such a binder—the power-take-off finds it easy. Grain binders, rice binders, corn pickers, spray pumps, etc., may all be run under difficult conditions, when the tractor power runs them as well as pulls them.

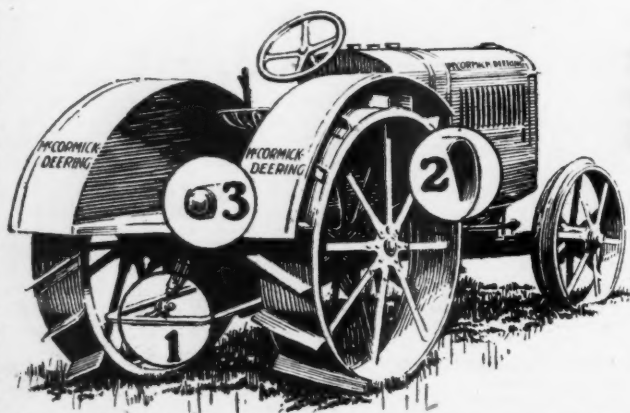
McCormick-Deering 10-20 and 15-30 are the first tractors regularly provided with this useful equipment. You may not need it right away but it is there when you want it in years to come. Make sure the tractor you buy has the power-take-off and you will find it has all these things, too—crankshaft and crankshaft ball bearings guaranteed for life, removable cylinders, unit main frame, ball and roller bearings at 28 points, throttle governor, belt pulley, platform, fenders and brake. Write for a catalog or see the dealer.

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### The Three Sources of McCormick-Deering Power—

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2. The Belt Pulley
3. The POWER-TAKE-OFF

## Hail, the Avocado

(Continued from page 4)

has them in all sorts of shapes and says at present he can give any shape or size that dealers desire. Some of his discoveries are startling. He has developed trees which bear from one to six avocados on a single twig, in fact, the successful hybridization of this strange fruit and vegetable and its development along specialized lines seem to indicate, in the minds of some experts, that even more can be done in the creation of new varieties than Luther Burbank has done with the plum.

Although Florida is just waking up to the commercial possibilities of the avocado, there is already a considerable production around Miami and Palm Beach. In the fiscal year 1922-23, the avocado crop was worth \$523,907 to the growers. This was a yield of 53,297 crates from 131,120 trees. There are some experts who believe that it can be popularized to the extent that grapefruit has been.

Avocado pears are now produced

weighing all the way from one to five pounds each. They are produced not only in a wide variety of shapes but, strangely enough, in a great variation to the colors of the fruit. Thus, there is the "Sharpless," which is pear-shaped and a purplish maroon in color. The "Gottfried," a hardy Mexican plant, is purplish black when ripe. No doubt it will ultimately be grown through the Southern Gulf States out of the belt of marked frost. The development of frost-resisting crosses is one of the improvements in avocados that is expected. The fruit of the "Estelle," the "Winslow," and others is green in color. The different varieties can be grown so that the fruit will be ripening almost every month of the year, especially during those months when the avocado brings the highest prices. This is very important from the growers' present viewpoint, as during the Christmas holidays avocados will bring from 25 to 50 cents apiece. But ultimately growers hope to sell in greater quantities at lower prices. Most of the avocado crop in Florida

is now sold between August 15 and September 15, according to several leading growers. At this period prices are depressed. However, the avocado has a wonderful range of seasons. The "Estelle" ripens in June and July; the "Pollock" in August and September; the "Wagner," a Guatemalan type, in February and March, and thus varieties may be chosen to supply the fruit almost continuously throughout the year.

### Avocados Command a Stable Price

I have probably eaten avocados in as many different countries as the next man. I have eaten them all through Central America, in Hawaii, the Philippines and through the West Indies and northern South America. In every country, no matter how plentifully they were grown, I found they commanded a stable price, just like eggs or chickens. Among the Quiches, who are descendants of the ancient Mayas, avocados are sometimes used as currency. This is because they are a real food and their value is stable. The people live on

them almost solely for months at a time. Fed to chickens, the Indians say the chickens lay twice as heavily. They also feed them to song birds to make them sing. They are about the only protein food in many sections (with the exception of beans) that is not heavy and can be eaten freely in the tropics.

According to one famous authority, the avocado represents nature's way of providing a wonderfully nutritious food for the birds and monkeys. In Guatemala the fruit is sometimes raised in the mountains where the air is chill and far above the range of monkeys. It is the belief of Edward Simonds, of the Plant Introduction Station at Miami, that the fruit can become the basis of a great industry. At present avocados bring large sums at the great hotels where they are esteemed the choicest of delicacies.

### West Indian Type Most Popular

The most popular varieties of the fruit grown in Florida are of the West Indian type. This is the most tropical type raised in this country and reaches the largest size. The Guatemalan type is not as large. Experiments are now under way to produce a small sized avocado for one person that will possess all the nutritious properties of the largest fruit.

## Flowers That Are Divided

by Robert Sparks Walker

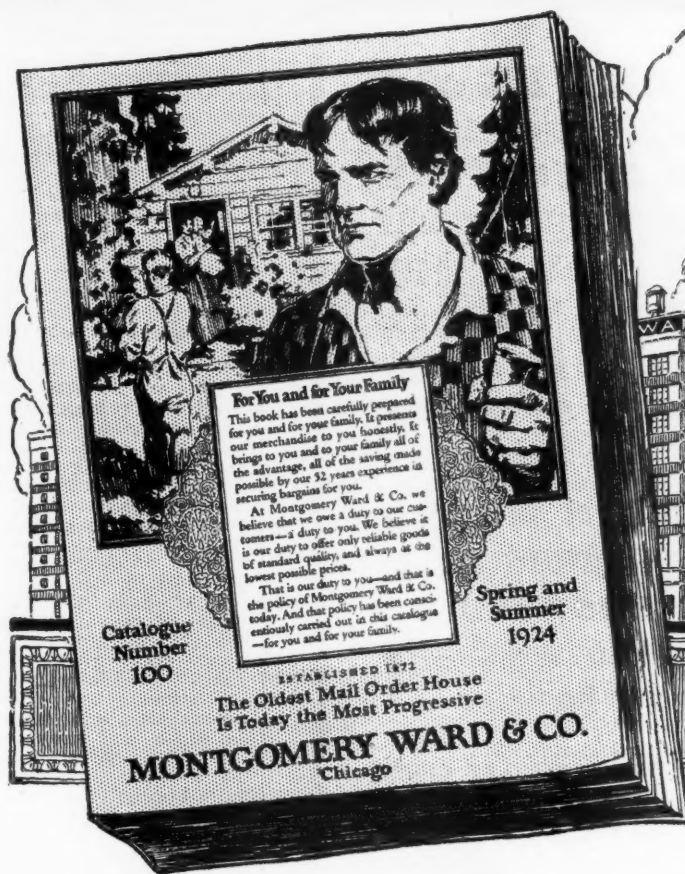
**I**HAVE a persimmon tree growing in my front lawn which produces thousands of blossoms regularly each spring, but in all its history it has never been known to produce a single persimmon. The honey-bees come to it in swarms while it is in bloom and they carry the pollen and nectar away. The persimmon extends over a wide range of territory, and many people who are fond of its fruit have yet to learn that this tree is one that separates its flowers. If you have a persimmon tree which has been blooming and never fruits, remember that if it were possible for you and your tree to live eternally upon the earth, you would never have the opportunity of picking ripe fruit from it, unless you top-work it to some fruiting variety.

The flowers of the persimmon are divided, the male or staminate flowers growing on one tree and the female or pistillate flowers growing on another. The trees producing the staminate blossoms of course never produce fruit, and were it not for the bees and a few other trustworthy insects, it is not likely that we would have persimmons on any trees. So if you have a persimmon tree that produces blossoms and no fruit, you may well content yourself with what pleasure you are able to enjoy from its shade and beauty. This same thing is true of some varieties of strawberries. Some have their flowers divided, and those which produce no pollen must be planted near enough to the staminate varieties that bees can carry the pollen and distribute it on the flowers, otherwise they will be as fruitless as my persimmon tree. I have known of inexperienced farmers who, in setting out small patches of strawberries for home use, selected imperfect blooming types of strawberries and then, through ignorance, laid the blame on the nurseryman who sold the plants.

**D**ECIDUOUS fruits should be picked in a "firm-ripe condition," Prof. E. L. Overholser, Pomologist of the College of Agriculture, University of California, recently told a convention of growers in California. He pointed out that such fruits would keep well in storage and would develop the maximum flavor and sugar so as to be in the best possible condition when marketed.

"According to records of fruit picked at various stages of ripeness," Prof. Overholser said, "the time of picking has an important effect upon color, flavor and storage behavior. Fruit picked in the so-called 'hard-ripe condition' showed less development of sugar and flavor. Fruit picked in the 'soft-ripe' stage and placed in storage soon breaks down.





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As we serve—so shall we succeed.

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# A Personal Message from the President of MONTGOMERY WARD & CO.

As you turn the pages of this new Spring and Summer Catalogue there is just one thought uppermost in your mind:

*"What is there of interest in this book for me?"*

*How much saving is there for me?"*

*What can Montgomery Ward & Co. do for me?"*

In imagination I look into the homes of over five million customers into which this book goes, and in each I seem to hear these same questions asked.

And as I sit here in my office and look around at over one hundred acres of floor space, filled with new merchandise, I see the answer so plainly, the many advantages, the great saving, that I wish there might be some way of bringing you more closely together—you and Montgomery Ward & Co.—so that you might learn for yourself the answers to your questions.

If I could draw up a chair with you there at your own living room table and turn with you the pages of this Catalogue, I would tell you the most interesting business story you have ever heard.

It would be a story of how thousands of our bar-

gains are secured, how our low prices are made. It would be a romance of ready cash and the tremendous buying power your patronage gives us. And of travel—travel through every part of this land and in Europe, searching for good merchandise at the lowest possible prices.

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But he knows how to make good goods. We furnish the needed extra capital, we give him orders that make the wheels turn all day and keep his employees busy all the year. His own earnings are increased and his cost of manufacture cut far below anything he has ever known. And this saving goes to those who buy goods at Ward's—to our customers. What can we do for you?

You want to buy goods at a saving. You want to buy goods that will give you complete satisfaction. You want prompt service. You want your orders

filled promptly, and your letters answered promptly—and you want your patronage appreciated.

At Montgomery Ward & Co. you get all these things. These are the advantages that are waiting here for you.

A saving—yes, we try always to offer you a saving, but always a saving on goods of Ward Quality. I cannot lay too much stress on "Quality." We do not sell "cheap" goods. It is our policy to offer you only goods that will stand up, that will give service, that will do exactly what you want them to do.

It is easy to sell at seemingly low prices. All you need do is to buy low-priced goods. Cut something out of the quality, out of the service, and you can always make a low price. At Ward's we never sacrifice quality to make a low price.

And, for fifty-one years this has been the policy of Montgomery Ward & Co. For fifty-one years in every dealing with every customer we have tried to follow a "deal as you would be dealt by" policy.

Millions of people will buy from this Catalogue—at a saving. The same saving, the same guarantee of satisfaction exists for you. We solicit your patronage. We will deal with you as you would be dealt by. And your orders and letters will always be appreciated at Montgomery Ward & Co.

*Theodore F. Mercedes*  
President

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**This extra heavy Red-Top gives marvelous results on poor roads and under heavy loads.**

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### Cherry Culture in France

by Edward Connor

THE CLIMATE of France is exceedingly favorable to the cultivation of cherries, which are grown either in valleys or on the hillsides. The south and central parts of France have every reason to boast of their splendid varieties. Cherries should never be grown too near a forest, as the latter causes them to ripen too rapidly and to lose their flavor, besides exposing them to the incessant peckings of sparrows and other birds.

According to experienced growers, cherries require to be grown in the open as much as possible, where light and air will be able to circulate freely. Cold and fogs are dreaded, owing to their tendency to strip trees of their blossoms.

Of the several varieties grown in France, the most popular are "L'Anglaise" and "La Royale d'Angleterre," both of which belong to an early kind, being quite ripe for gathering towards the end of May. Their color is deep red, and though slightly acid to the taste, they cannot be said to be at all unpleasant. "L'Anglaise" is that most in demand by exporters. Of the two it is certainly the choicest for eating. The "Montmorency" is another favorite variety. Its familiar and well-deserved name in France is "La Reine des Cerises" or "Queen of Cherries." Its flesh is very velvety and sweet. There are two kinds of "Montmorency" cherries—both of which are ripe for picking in July—the long and the short stem. These cherries are a hardy fruit, being much better able to resist severe frosts than any of the other kinds. They are extensively cultivated in France, as the

demand for this particular cherry tends to increase more and more every year. It is estimated that there are altogether some 20 different kinds of cherries grown in France, which in turn are subdivided into nearly as many varieties. Of these, nine are cultivated in orchards and nine other kinds in ordinary gardens.

#### Harvesting

The gathering of cherries in France always forms a pleasing spectacle. Growers get up as early as three o'clock in the morning in June and July and start picking the fruit, which looks more tempting than ever at that hour. Other peasants, with their carts, are stationed close by, ready to convey the fruit to the nearest railway station; others do nothing but weigh the baskets as they are brought to them previous to their departure. Due note is taken of market prices both in Paris and elsewhere; on these, business for the day is based.

As soon as 12 o'clock (noon) has struck, the picking instantly ceases, part of the afternoon being devoted to seeing the fruit off to its respective destinations in special fruit vans and by special express fruit trains. When cherries are plentiful, it is not unusual to see as many as 20 wagons loaded with baskets all filled with beautiful cherries. The two stations at Auxerre and St. Bris have been known to dispatch between them as many as 1,000,000 kilogrammes (one kilogramme equals two pounds) of cherries during a single season. The picking, as a rule, is done by women and children. Cherry-culture pays well in those parts of France; provided the year is a good one, the an-

nual sale of cherries at St. Bris often amounts to 100,000 francs.

Cherries are also extensively grown in the environs of Paris. Cherries intended for Kirchwasser are chiefly grown in eastern France, where they are said to be gradually increasing in value. The converting of cherries into Kirsch (a popular French liquor) constitutes a very important industry—the distilling process brings in quite a respectable income to the state. During the severe winter of 1879-1880, the French treasury lost some 80,000 francs as the result of the terrible weather that prevailed and which completely destroyed more than two-thirds of the cherries purposely grown for the making of Kirchwasser. Several varieties of cherries are employed in the preparation of Kirsch in France, red and black cherries being equally acceptable by distiller.

A cherry tree 20 to 30 years old is reckoned to yield between 30 and 60 kilogrammes of cherries.

The Department of the Franche Comté produces 12,000 hectolitres (one hectolitre equals 22 gallons) of Kirsch annually. Seventeen and a half pounds of cherries are required to make one litre (one litre equals one and one-half pints) of Kirsch.

Very excellent wine is made out of cherries in different parts of France. The "Marsotte" is a variety specially suited for this particular purpose. It is a very nice looking fruit indeed, the eating of which, however, should not be abused, as consumers are liable to really become intoxicated by doing so.

Whence have we cherries? This well-known fruit formerly grew wild in the woods near Cerasus, in Pontus,

on the southern coast of the Black Sea. It is from there that Europe received its first cherries; the latter were already familiar many years before that great Roman general, Lucullus, imported them from Asia. Cherry trees were planted in England in Henry the Eighth's time, in the neighborhood of Sittingbourne, in Kent, which is still famous for its numerous cherry orchards. Sir Walter Raleigh—of potato fame—was the first person to plant cherries on his estate at Youghal, where some of his cherry and myrtle trees are still to be seen. Black cherries, according to several leading Swiss distillers, make the best and strongest spirit, known as Kirschwasser.

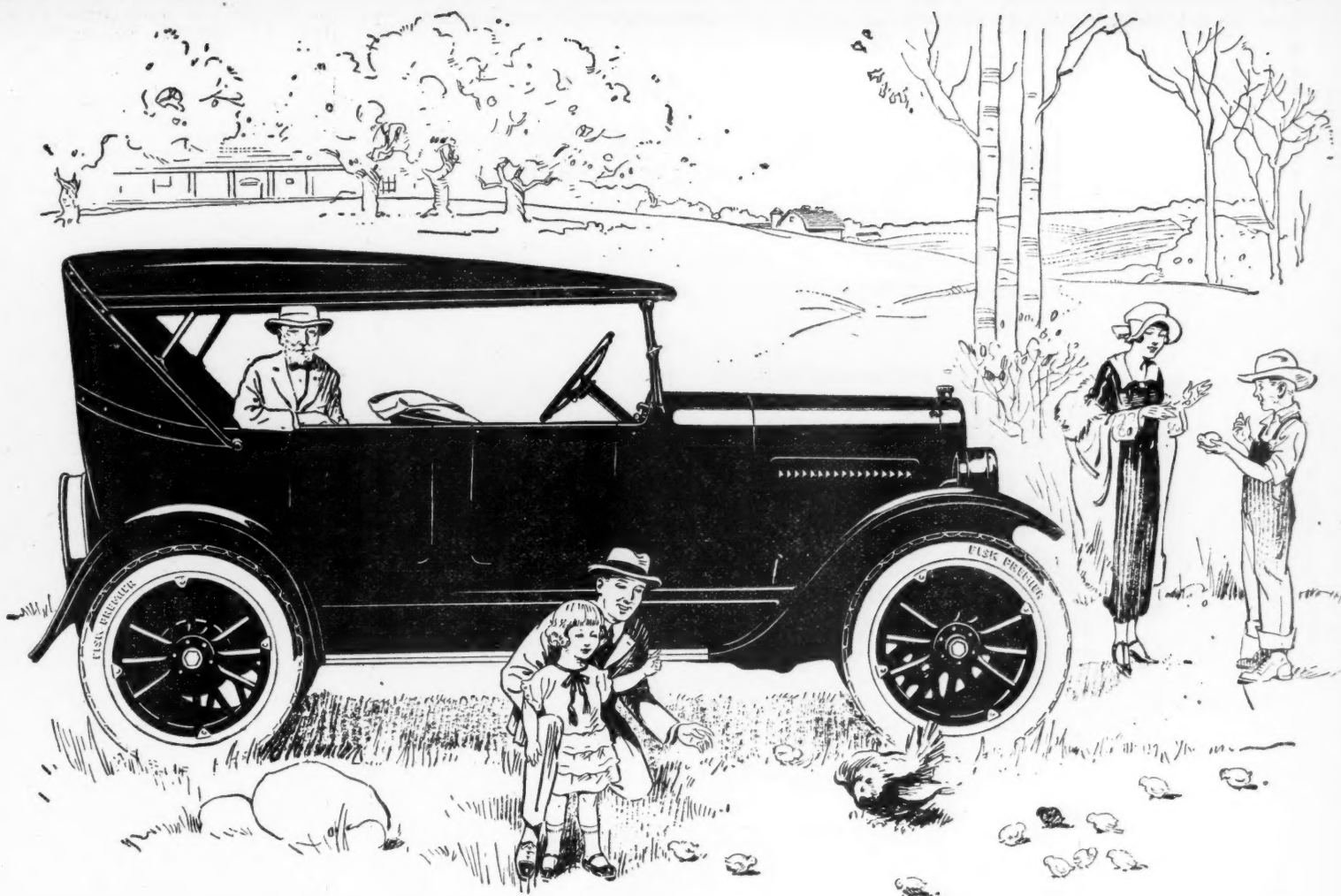
The medicinal qualities and uses of cherries are remarkably numerous—especially in France, where they seem to turn everything into good use. Being a very delicate fruit, their consumption is proportionately large. The French medical profession highly recommends *cerises* or cherries as being most refreshing and conducive to general good health. The "Griotte" is the kind of cherry most frequently prescribed by doctors in France in cases of fever. The "Bigarreau" is considered the only indigestible variety of cherry grown on French soil; though unquestionably savory, they should be eaten with the greatest moderation. The "Guigne" and "Griotte" cherries are left to dry during the winter and summer months on shelves, in a moderately heated room. They are specially chosen for preserving in brandy, or converted into jam. The French—who are admitted to be a most economical people—make a capital oil, which they extract from the kernels of cherries. This emulsion has become quite famous, and its curative properties have become equally proverbial. Confectioners also make very good use of the *noyaux* or stones of cherries. The gum—which, like resin, runs down the sides of the cherry tree—is not only valuable, but very nourishing, much more so than many persons imagine. It is largely employed for medical purposes. Hasselquist, the Swedish botanist and professor of natural history, relates that during a siege more than 100 men were kept alive for months merely by putting a little of the gum into their mouths and allowing it to dissolve gradually. It also does duty as gum arabic.

The Department of the Yonne may truly be called the cradle of cherry-culture in France. Long before railways were ever thought of being constructed, the trade carried on in that particular fruit (cherries), chiefly with England, was a very extensive one indeed. At that epoch cherries were conveyed on the backs of donkeys from one village to another, and exchanged for poultry and milk. It was quite common more than 60 years ago in France to be given a dozen eggs or a half pound of butter for a couple of pounds of cherries. Four pounds of the same fruit were equal to a couple of fowls, while the grower who was able to bring 100 pounds of cherries to market experienced no difficulty in obtaining 20 pounds of butter, 100 eggs and half a dozen fowls.

### Ships Nearly Twice as Many Apples as Last Year

SHIPMENTS of apples by the Sebastopol Apple Growers' Union, Sebastopol, Calif., totaled 1,051,765 boxes in 1923, as compared with 592,595 boxes in 1922. Of the total 1923 shipments 879,560 boxes, 83.6 per cent, were Gravestins. Spitzenbergs came second with 38,789 boxes, followed by Kings, Jonathans, Baldwins, Wageners, Rome Beauties, Rhode Island Greenings, etc., through 44 varieties. Total business for the year amounted to \$1,293,423. Capital stock outstanding amounts to \$193,650, while a reserve fund for advertising is \$17,575, and a reserve for contingencies is \$14,539. The property and equipment is valued at \$303,035.—Agricultural Co-operation.





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Owners continue to comment on the marked riding comfort of Dodge Brothers Motor Car.

Increased chassis length, low-swung body and generous seat depth have much to do with this.

Primarily, however, it must be accredited to the greater buoyancy of the new spring equipment. The rear springs are ten inches longer, and underslung.

The price of the Touring Car is \$895 f. o. b. Detroit

DODGE BROTHERS



### Development of Balloon Cord Tire

by W. O. Rutherford

A NEW and interesting tire development has recently appeared on the market under the name of Balloon Cord. Perhaps the question, "What is it and what will it do to my own car in the way of increasing driving comfort and economy?" has often been asked by those who have not had direct experience with the new development or have not come in contact with those who have.

Balloon Cords are nothing but tires with a larger air chamber and lighter carcass construction. Because of their size, they provide a greater

road-contact area, which in turn permits much less air pressure than that required by the standard high pressure cord tires.

The most important benefit to be derived from this tire development is that of increased riding comfort. The lower air pressure brings about a greater flexing, which, because of the tire's construction, is not injurious. This easy flexing smoothes out rough going by practically absorbing the shocks of bumps and ruts in the road before they are transmitted to the frame of the automobile.

The engineers of the large manufacturers in the tire industry who have sponsored the Balloon Cord's development, have pointed out that this low pressure tire will importantly serve

the farmer by adding a margin of super-service to his car. There is a distinct improvement in driving comfort and this improvement is most noticeable in the kind of service to which the farmer puts his car, over the kinds of roads he must travel in the average rural community.

The Balloon Cord has its fundamental economic worth in the reduction of mechanical upkeep. Automobiles equipped with these tires are comparatively free from mechanical difficulties, such as spring breakage, crystallization of axles and driving shaft or motor parts. The greater driving comfort provided also adds some economic value through increased utility and speed.

It is manifestly impossible to drive

some types of cars over rough roads at what might be considered a medium high average speed. Here, then, is where the Balloon Cord serves as a boon to the farmer in making the use of his car more practical and efficient under certain weather and road conditions. The Balloon Cord not only gives better traction in soft going, but its ability to absorb shocks and jars of road ruts facilitates steering in such roads and enables the driver to maintain a higher rate of speed.

Gasoline consumption is no greater with these large soft tires because in reality less mechanical energy is required to push the car over obstructions or bumps in the road.

The future of the Balloon tire is seemingly assured. It apparently presents a significant benefit to the constantly growing family of motor car owners. It is a step toward rendering the motor car still more indispensable, by providing greater riding comfort and broadening the scope of its efficient utility.

### Why Soils Require Lime

(Continued from page 8.)

is largely a solution of such soluble salts.

Aluminum is an amphoteric substance, i. e., acts both as an acid and as a base. With this conception in mind a clear and definite idea may be formulated regarding the nature of acid soils and the manner in which they act.

It has been shown conclusively that nitrification takes place readily in acid soils. The amphoteric aluminum which is always present in acid soils acts as a base and neutralizes the nitrous acid produced with the formation of aluminum nitrite and ultimately aluminum nitrate, which is toxic to plant growth. The toxicity, of course, varies with the kind of plant grown and the amount of aluminum nitrate present. With this in view before us we have a clear conception of the nature of soil acidity and the manner in which it acts upon the plant.

With a full realization of the cause, the nature and the effect of soil acidity, the careful student is fully prepared to consider proper economic means of correcting this detrimental soil condition.

### The Universal Fruit

by L. H. Cobb

WHY SHOULD not a grape be on every farm and every town lot? It is the fruit that has been grown in every conceivable location and makes good everywhere. Planted by a fence, it will cover it with foliage and bear an abundance of fruit. It is at home on the side of a building or climbing over a trellis in front of a window or porch. There is no home without space for a vine or two, and the vine or two will furnish fruit nearly every year, for grapes seldom fail to bear. If there is a waste spot on the farm, no matter where, grapes will make it productive.

While many cultivate and feed, I have seen most excellent grapes grown where a straw or grass mulch was kept around the roots to keep weeds down and hold moisture. Grapes will bear without pruning, and over windows and other places where room is afforded and the shade desired, that is the method used most frequently, and the smaller size of the fruit is pretty well made up by additional bunches. The flavor is improved some by pruning, and where possible, it is best to prune well early in the spring each year.

In pruning an old neglected orchard it is not advisable to do all of the pruning at one time as it is apt to result in stimulating secondary growth. It is much better to remove a portion the first year. This will keep the tree in its proper growth balance and prevent, to a large extent, second growth. —*Colo. Agr. Coll.*



## Spring Precautions Against Pear Blight

by L. H. Day

University of California

THE PEAR grower has no reason to believe that the blight will be materially retarded this spring by the dry weather, except possibly in unirrigated orchards. In districts where this disease has been serious the past year, the orchardists should begin early to prepare for the spring campaign.

During the latter part of the blooming period, he should begin searching for diseased blossom clusters on the fruit spurs in the lower parts of the scaffold branches, for it is here that infections may creep into the main branches and do serious injury to the trees. If found soon after infection, the spurs may be clipped out before the disease gets into the scaffold, or if it has penetrated to the scaffold, it is an easy matter to arrest the development of the canker before it injures the cambium layer. All wounds made in removing diseased spurs should be disinfected with the mercury-glycerine combination to prevent insects from carrying the disease down from affected blossoms in the tops of the trees. Rain may also spatter the disease down from infections above.

All second bloom should also be removed, especially if there is any indication that there is much blight in the orchard or in neighboring orchards. The second bloom is a very favorable place for new infections to take place. The orchard should be gone over at regular intervals of a week or 10 days throughout the whole spring and early summer, if possible, and all infected twigs and branches cut out and cankers on larger limbs scarified and disinfected. It is not best to remove watershoots from the trunks and scaffold branches during the active period of the disease because the wounds may become infected. Also the new buds which may be forced to grow out at the point where these were removed are very readily infected by blight.

In cutting off twigs and branches, the cut should be made to a lateral a foot or more below the external evidences of the disease, and the wound disinfected. The severed branch should not be allowed to fall through the tree as this will wound healthy branches and inoculate them with the blight bacteria. Each twig or branch severed should be examined to make certain that no streaks of the disease were left in the tree. As a precautionary measure, the twigs should be raked together and burned.

The success of the scarification process to arrest the development of cankers depends upon the fact that the disease runs in the outer bark for some time before penetrating inwardly to the cambium layer. If the cankers are operated on when new they can be arrested. This operation consists in shaving off the outer green part of the bark down to the fibrous layer all over the canker and for several inches beyond the evidences of the disease. Not the least speck of outer bark should remain within this area. In the thick tissues in the crotches and around branch collars, old bud scars, wounds, etc., the bark should be shaved nearly down to the cambium layer.

If cankers become somewhat aged before discovered, it is necessary to shave down deeper until faint lines of white, healthy tissues begin to show through the tissues blackened by the disease. But the operation is not so successful on these older cankers for the bacteria may get too deep to be reached by the disinfectant, or the bark may have to be shaved down so close to the cambium layer that the disinfectant will kill the cambium. For this reason the orchard should be covered every week or 10 days. The fewer the number of infections left in the tree, the less will be the number of new infections taking place. Then, too, if not discovered within a week or two after becoming infected, many of the limbs will be diseased beyond

recovery and heavy loss will result. Time should not be spent in treating smaller limbs—cut them out at once—because more important ones in other parts of the orchard may be getting beyond recovery while this is being done.

The disinfectant which has been found most successful for the wounds and for the operating tools and shears is made up as follows: Dissolve eight half-gram tablets of cyanide of mercury and eight half-gram tablets of bichloride of mercury in one pint of water and to this add three pints of commercial glycerine. Apply with a paint brush about one and one-half inches wide. Keep the material in a glass jar—never in metal containers.

Only conscientious workmen should be entrusted with the blight work and there should be constant supervision of the work by the orchard owner or experienced blight cutter.

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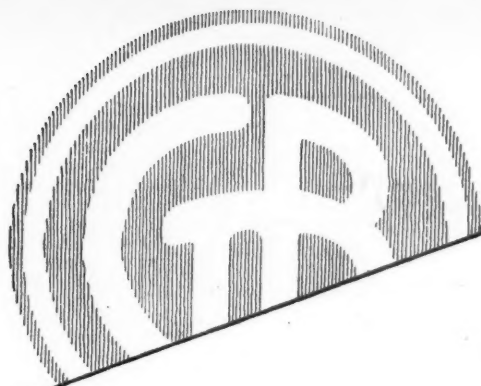
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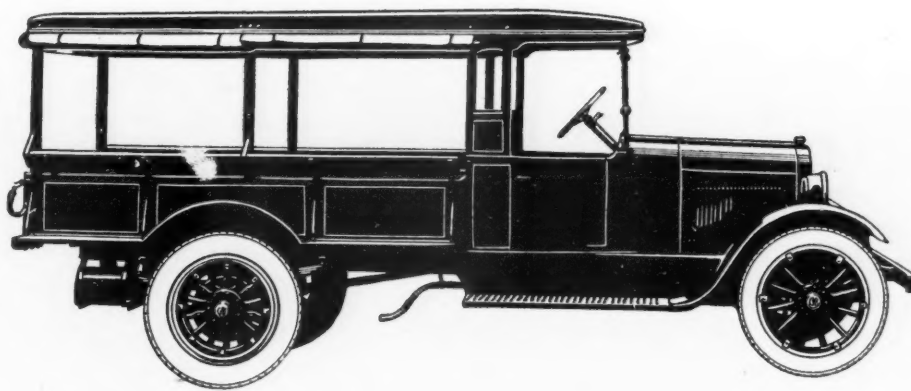


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## "Spurring" Your Cherry Tree to Action

(Continued from page 4)

wood, the scientists answer, in order that the lower, larger portion of the tree may be benefited. Those same "best" cherries will grow as well lower down—and there will be more of them.

Besides being of service to the lower part of the tree in keeping it as vigorous as the top, pruning the top makes picking more convenient. Tom, who is "putting on weight," dislikes to risk losing his dignity and his equilibrium while he stands on a 10-foot ladder to pluck the finest cherries in his garden. And the 10-foot ladder is often necessary when a tree is allowed to grow at will. On the other hand, with proper pruning of the top, the tree will spread out, and a shorter ladder will reach every part of its upper area. In the case of a larger orchard, it makes harvesting cheaper, too, for even young boys and girls can be hired to do the picking, whereas if

for learning which of the buds were hardest. Upon examination at blossom time, it was found that wherever blossoms were developing on spurs of second year growth, the average was 139 blossoms for every 100 buds. On the other hand, where branches were not developing spurs, due to a less amount of growth the previous year—that is, where blossoms were being produced directly from the lateral branches—the average was but 28 blossoms to every 100 buds. Only on trees which had a large "spur fruiting system" were there enough blossoms alive to bring more than an average crop of cherries.

Again during the early months of 1923, intense cold gave the buds a severe test. But according to the rule of "survival of the fittest," a large percentage of the spur bud blossoms came out alive.

The difference between tender and hardy blossom buds has been found to be a simple one. During the summer time, blossom buds which are to produce cherries the next June become further developed on trees whose



Picking cherries is easy work when the tops of the trees are low.

trees are taller, more skilful pickers and higher pay are necessary. Trees are much easier to spray, likewise, when their tops are not so dense.

### Strong Branches Should Be Headed Back

If some of the branches anywhere on a tree seem to outgrow the other branches, these strong ones should be headed back quite severely. Too-strong branches take away the food and strength from those that are less strong, and the result is eventually the death of the weaker. At most, few cherries can be expected on those branches which are not strong. For this reason, keeping the tree in "balance" is necessary if, during each growing season, all the branches are to do the best of which they are capable.

Workers at the University of Wisconsin are responsible probably more than any other group for what is known as the "spur fruiting system." Their experimental work has been done largely on some of the famous Door county cherry trees near Sturgeon Bay, Wis. For seven years, orchards in that county have been under their observation with the result that, together with the determinations made in their laboratories, they are able to tell cherry growers why trees bear lightly or heavily.

Since the present home of most of these so-called "sour" cherry trees in this country is in the northern section, where winters are frigid, much thought has to be given to whether buds will withstand cold which is more than ordinarily severe. Some of the observations and experiments in Door county have been made with this fact in mind.

The winter of 1917-18 brought injury to almost all cherry trees. It was, as a result, an excellent season

branches make but little growth, and severe cold is more likely to injure them. But where branches are making from 10 to 15 inches of growth and spurs are developing, it may be said that the energy of the tree is being used to grow new wood, and its blossom buds do not develop far enough to be harmed by a winter's exceptional cold.

While it is quite well known that not every blossom is able to make a ripe cherry, pruning is found to stimulate the setting of the blossoms so that less of the green fruit falls to the ground. Even after pruning has caused a reduction in the number of branches, larger crops are produced than where the tree has been untouched by the pruning knife, for usually when blossoms are very numerous, it is true that many are lost before they become ripe.

### Do Not Force Young Trees Into Bearing

Some folks don't like to wait very long for their cherry trees to produce heavily. On trees that are quite young, therefore, they allow heavy crops of cherries to grow. Experts, however, have discovered that in the end forcing young trees to bear heavily is bad practice.

The cherries on these unpruned young trees come mostly from the blossom buds on branches of six inches or so formed the year before. Longer growths, then, are not made; the spurs do not form; and a "spur fruiting system" is not started. So while they give earlier returns than trees which are pruned and started on the spur system, they will not give so great returns after they are older.

Prune Trees Before Setting Them Out  
It is advised that new trees be

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pruned as soon as they are set out. This should be done somewhat heavily because roots which are too long, or which have been broken, must be cut off, and the top should be no larger than the roots, to be sure of a vigorous growth of the tree. All of the weak branches should be pruned back at this time, leaving the best growths for leaders and preserving at least two good buds on each branch.

One year after the tree is planted is the time to begin to train it into shape. Then the main branches should be selected; branches which are crowding the others should be removed; the top should be made as equal-sided as possible; and if any of the branches have grown "leggy," they should be headed back. In the second, third and fourth years of the tree's existence, pruning differs little from that of the first year. This work is done that the tree may be started to growing in the proper



The branch at the left made the longest growth. Just look at the cherries in comparison with those on the other two branches which made only short growths.

shape while it is still very young. Then the later pruning for developing the spurs and for keeping the fruiting wood alive is not a difficult matter.

It costs but very little to keep a cherry tree pruned each year—about the price of a pint of cherries! There is also a choice in time of pruning. The spring time, before the buds start, is preferable, the experts say. And yet the work may well be done in the summer or in the late fall or early winter, if one is too busy in spring. The time is not so important as the "getting it done." Trees should be pruned every year to avoid heavy cutting at any one time.

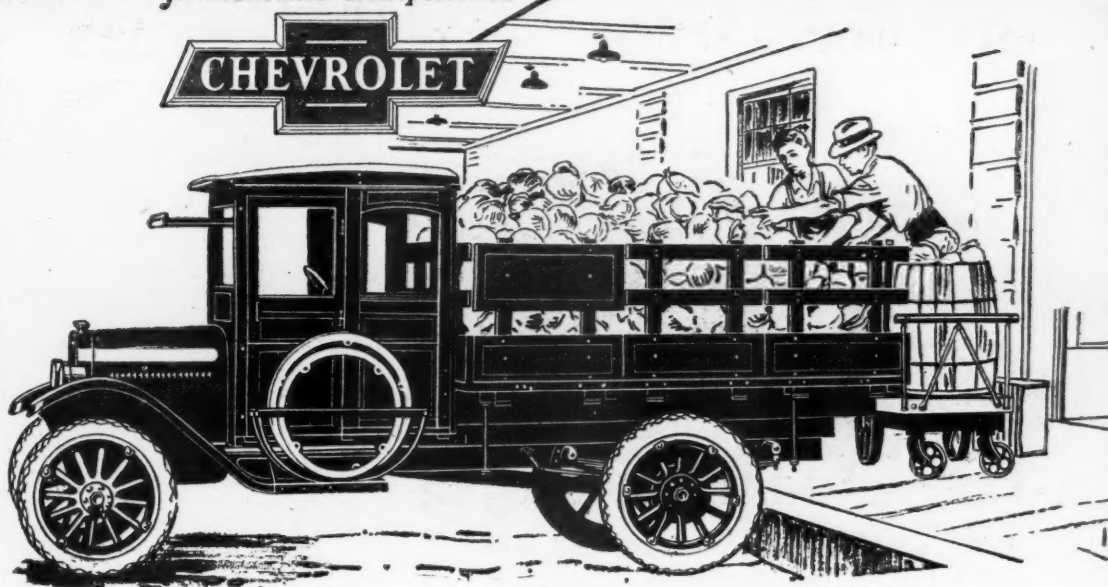
At cherry picking time, a tree can be most conveniently examined to see what it needs. Then, because all the leaves are on, it is easy to tell whether the top is too dense for the good of the lower branches. Where the cherries grow can be seen. Whether the tree is growing vigorously enough to make spurs possible can be determined, for, contrary to the usual opinion, a tree has made most of its new growth of wood at cherry harvest time. With the tree's needs in mind, then, both the man with the 40-acre orchard and the man with the backyard tree will be ready to prune wisely and well when the convenient time arrives.

### Grafting Peach on Plum

Can I top-work or graft a peach tree to a plum, or vice versa? I have noticed that when grafted on plums, a peach makes about twice as much growth as the plum.—J. E. I., Indiana.

THE PEACH and plum are closely enough related so that either may be grafted on the other. This is rarely done, however, by top-working since the one does not grow as fast as the other, thus making a weak union. In the nursery, however, the plum is successfully budded on peach roots.—Paul Stark.

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## Soil Management of Peach Orchards

(Continued from page 3.)

Only rarely do peach orchards fail to respond profitably to some form of fertilization. Orchardists need be less concerned about the general value of applying fertilizers than about the correct diagnosis of the needs of the trees with reference to the particular elements of plant food needed. Do the trees need nitrogen, phosphorus, potassium or calcium; do they need any two of these or any three or all four? How much of any or all is needed?

There are two ways for the orchardist to solve these questions. One is to use a complete fertilizer carrying enough of each plant nutrient to satisfy every possible need of the tree. If one or more element is not needed, it is wasted but not likely to be harmful. The other way is to study the condition of the trees, the theory of the effects of fertilizers, and the available recommendations for peach fertilization, and make a shrewd surmise which, with a little inexpensive experimentation, will give the information wanted, generally at considerable saving in expense.

For example, nitrogen stimulates growth, gives the foliage a dark green color, increases size of fruit and de-

lays its maturity. Weak trees are always benefited by nitrogen fertilizers and trees in good vigor are kept in thrifty condition by moderate fertilization with this element. Many experiments and endless experience indicate that nitrogen is generally the most effective single fertilizing element for peaches.

This element, which is used in considerable quantities by the peach crop, is generally present in peach soils in comparatively small amounts. The typical peach soils of Michigan, Ohio, New Jersey, Georgia, the Virginias, Arkansas, Texas, Illinois and Missouri often have 450 years' supply of potassium, 115 years' supply of phosphorus, and only 40 years' supply of nitrogen in the surface soil, where most of the nitrogen is stored. Comparatively speaking, nitrogen is scarce and more likely to be wanting than the other soil nutrients.

### Potassium Stimulates Growth

Potassium is used freely in the green coloring matter of the leaves, the active agent that changes raw elements of plant food into starch and proteins. Like nitrogen, it stimulates growth. It improves the color of peaches and increases fruit bud formation. Potassium is always present in large quantities in clay soils, is comparatively scarce in sandy soils and low in peaty ground. It is less avail-

able in clay than in sand. As its forms are comparatively insoluble, the trees often fail to obtain enough for their needs in spite of the large soil content.

Phosphorus is an active element in seed formation and appears to hasten maturity of the fruit. Although phosphorus is seldom present in the soil in very large quantities, the peach requirements are small and the soil usually furnishes enough of this element. Acid phosphates are, however, stimulating to root development and are valuable used with other fertilizers to give young trees a good start or to encourage rapid root development in spring in the case of mature trees.

Calcium is used in considerable quantities by both the trees and the fruit. It has effects somewhat like potassium in increasing the food transforming activities of the leaves. The amount of calcium present generally determines the acidity or alkalinity of the soil and affects bacterial action, the release of plant food, and the root responses of the plant. Peaches tolerate some acidity of soil and seldom fail to obtain enough calcium even from an acid soil, but legumes fail under such conditions and cannot be used as cover crops if the grower wishes to use them as part of his plan of orchard management unless calcium is supplied.

The peach grower supplies the common soil nutrients in stable manure, commercial fertilizers and legumes.

### Stable Manure a Profitable Fertilizer

Stable manure furnishes all the elements required, greatly stimulates growth, gives as large or larger yields than any other fertilizer, delays maturity, lowers color and increases size of fruit. It is costly to apply and



Photo Courtesy University of Illinois.  
The tractor is the best source of power for cultivation except on very steep land.

comparatively scarce. Where available, it is a very profitable fertilizer. In commercial fertilizers, nitrogen is best applied as sodium nitrate or ammonium sulphate, phosphorus as acid phosphate, potassium as muriate of potash, sulphate of potash, or wood ashes, and calcium as ground limestone.

Legumes may be planted in July and grown during late summer and August as cover crops and green manures to add humus and nitrogen, but they are generally detrimental to the growth and yield of the peach trees unless the trees are fertilized with potassium. Careful experiments on a soil typical of the peach districts of Illinois showed that an annual cover crop of cow peas was disastrous to yield and growth unless potassium was used to correct the detrimental effect of the cow peas.<sup>1</sup> Potassium fertilization proved to be a specific, however, for the detrimental effects of the cow peas and proved that they might be used if needed either to furnish humus or nitrogen or to prevent soil erosion on hillsides.

The remainder of this article is devoted to specific directions for cultivating young and old peach trees, coordinating the theories and suggestions of the above paragraphs into systems of culture which are reasonably sure to give good results as to yield and profits.

### Caring for the Soil in a Young Peach Orchard

Cultivation, beginning as soon as the land is fit to work in the spring

<sup>1</sup>Responses of a Young Peach Orchard to Certain Cover Crop and Fertilizer Treatments. B. S. Pickett. Trans. Am. Soc. for Hort. Sci. 1920. Pp. 193-197.

and continuing at intervals of two or three weeks till midsummer or even till the end of August, is the basis of the treatment for a rapid growth of young peach trees. In Michigan, New York, Ohio and Ontario, this cultivation often begins by plowing the ground with a turning plow and following this with disks, spring-toothed cultivators and harrows. Many growers prefer fall plowing to spring plowing, turning the soil toward the trees to give additional protection to the roots of small trees particularly, and providing drainage towards the dead furrows which are left half way between the tree rows. In the south and middle west, peach orchards are seldom, often never, plowed with a turning plow after they are planted, spring cultivation consisting of disking, and summer cultivation of disking or harrowing according to the needs of the soil at the time.

Young peach orchards will grow more vigorously if they are not intercropped, but most orchardists find it necessary to grow an income-producing crop between the trees for the first two years. The least harmful intercrops are melons, squashes, pumpkins, cucumbers and tomatoes. Corn and cotton are fairly satisfactory and one or the other can be grown profitably in most peach regions.

When peaches are planted on soils subject to erosion, cultivation should be delayed in the spring till the period of heaviest rainfall has passed and a cover crop should be sown between the tenth and fifteenth of July, the roots and tops of which will prevent soil washing during the fall, winter and early spring. The planting of a cover crop is also advisable on soils which are low in organic matter, the crop residues adding to the humus supply when they are returned to the soil by cultivation the following year.

In general, the legumes are used for cover crops. Crimson clover or hairy vetch is best in northern and eastern peach sections, and cow peas are best in Maryland, the Virginias, Georgia, southern Indiana, Illinois, Texas, Oklahoma and other regions of corresponding climate. Legumes grown between the trees are likely to be detrimental to the fruitfulness and vigor of the trees unless corrected by potassium fertilization as recommended above, and the grower should make careful tests to determine the necessity for such corrections on his soil, or consult local growers and his state agricultural experiment station before adopting a system of cultivation and leguminous cover crops as his plan of managing the soil in a peach orchard.

Young peach trees may be pushed rapidly by fertilization without danger of deferring their earliness of bearing, but their growth should be controlled in order to prevent a late fall development of immature shoots easily killed by low winter temperatures. This is accomplished by fertilizing very early in spring, usually just as the buds are starting into growth, cultivating thoroughly through the early part of the season, and by ceasing cultivation and planting a cover crop in midsummer.

Five or six forkfuls of stable manure applied to each tree as a top dressing is one of the best methods of fertilizing a newly-planted peach orchard and, if manure is available, annual applications may be made as long as good results follow. The amount should be increased as the trees grow to a maximum of about 10 tons or wagon loads per acre in a mature orchard. Wood ashes are also very beneficial to peach trees, one peck to two bushels being applied to each tree, the amount depending on the age and size of the tree.

The following directions for using mineral fertilizers will also give excellent results.

First—For orchards in which leguminous cover crops are to be planted:

First year—200 pounds sulphate or muriate of potash per acre, spread broadcast over entire surface of ground; applied just before sowing cover crop. One-half pound sodium nitrate or ammonium sulphate per tree, applied as a surface dressing just as growth is starting in the



spring, to a circle about three feet across around the tree.

Second year—Sulphate or muriate of potash same as first year. Three-quarters pound sodium nitrate or ammonium sulphate and one-half pound sulphate or muriate of potash, per tree, applied as a surface dressing just as growth is starting in the spring, to a circle about six feet across around the tree.

Third year—Same as second year, increasing the quantities of sodium nitrate or ammonium sulphate for individual trees to two pounds and sulphate or muriate of potash to one pound, and enlarging the circle proportionately.

Second—For orchards which are to be clean cultivated throughout the season (no cover crop):

Follow the directions given for fertilizing individual trees in orchards in which leguminous cover crops are planted and omit the annual broadcast application of 200 pounds of sulphate or muriate of potash.

#### Soil Management of Mature Peach Orchards

Mature peach orchards should be cultivated as thoroughly as young orchards but certain differences in their general soil management must be observed. Intercropping, for example, must be discontinued; cultivation should cease in clean-tilled orchards about three weeks before the crop matures; and in many localities the planting of a cover crop in mid-summer will be abandoned as the trees overshadow the ground or the crop itself is destroyed or interferes with harvesting operations. In orchards subject to erosion, however, the raising of a cover of some kind is essential and should be attempted regardless of comparative failure, if necessary, substituting rye sown late in September for the mid-season legume.

Tractors greatly facilitate the cultivation of large mature peach orchards as they do not interfere with the trees and they permit the use of wide extension cultivators that operate comparatively close to low-headed trees without damaging the branches.

Stable manure used at the rate of 10 tons or wagon loads to the acre, annually, will give as large yields as any fertilizer known. It is not generally so available, however, as the common commercial mineral fertilizers and if it has to be bought and shipped any distance, it is more expensive, pound for pound for the plant food which it contains.

The following directions for using mineral fertilizers will give excellent results in mature orchards:

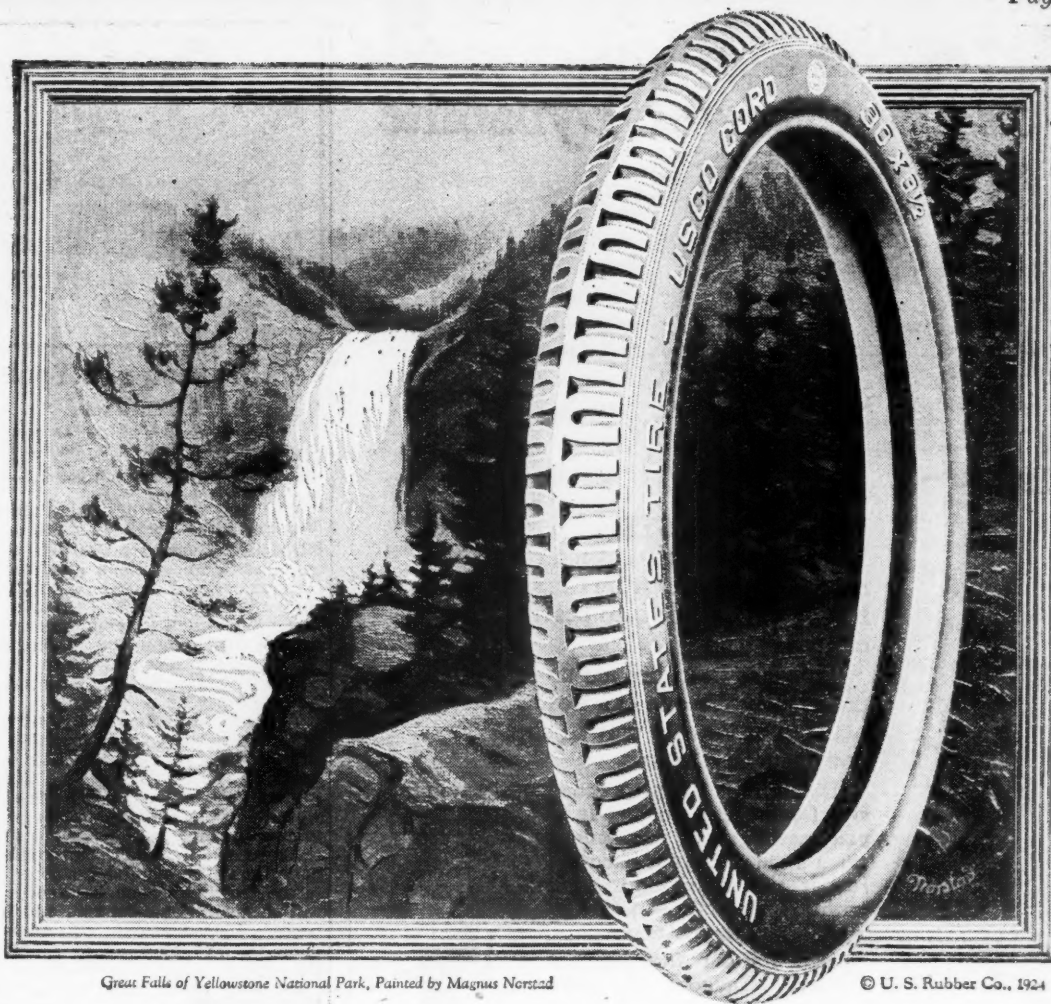
Fourth year—Two pounds sodium nitrate or sulphate of ammonia and one pound sulphate or muriate of potash per tree, applied as a surface dressing, just as growth is starting in the spring, to a circle the radius of which extends about two feet beyond the spread of the branches.

Fifth and ensuing years—Three pounds sodium nitrate or sulphate of ammonia and two pounds sulphate or muriate of potash per tree, applied as indicated above for the fourth year.

In the above directions, the use of fertilizers supplying phosphorus is not specifically advised, though stable manure carries appreciable amounts of this element of plant food. Beneficial results, however, sometimes follow applications of nitrogen and phosphorus and applications of nitrogen, phosphorus and potassium combined. Therefore, peach growers should test the responses of their trees to phosphorus by using it, preferably in the form of acid phosphate (six to 12 pounds per tree for mature trees), on enough trees to make a comparative test with other fertilizers, consult their nearest agricultural experiment station, and be guided more or less by neighborhood experiences.

Additional applications of sodium nitrate or ammonium sulphate are sometimes advisable in late June or July if for any reason the growth is poor and an additional stimulus is evidently needed.

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Great Falls of Yellowstone National Park, Painted by Magnus Norstad

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## Coming Horticulturists

**M**ASTER D. Lee Johnson of Assonet, Mass., member of a boys' and girls' club, is state champion in the growing of small fruits. From a 25-foot row of raspberries, a 50 by 50 plot of strawberries, a 110-foot row of strawberries, 50 feet of gooseberries, 20 feet of blackberries and from six grape vines, he sold \$125 worth of fruit. His expenses amounted to only \$11.75. He set his plants in thoroughly prepared soil, applied fertilizer in the spring, and sprayed three times.

Pauline Jeffries, of Orange, Mass., canned 639 jars of fruits, vegetables and meat, and 210 glasses of jams and jellies. She sold some of it to neighbors and some to the National Farm and Garden Ass'n, but the bulk was sold in an exclusive road shop on the

Mohawk Trail just out of Boston. She also exhibited canned fruits at fairs, winning prizes of \$50. Her total net income was nearly \$200.

The men and women who are doing boys' and girls' club work, though not taken as seriously by some folks as their work merits, are performing a wonderful service in instilling into boys and girls the right teachings about agriculture in the most impressionable period of their lives.

**M**ANY serious insects and diseases of horticultural crops have been introduced in plant stocks from foreign countries, and to prevent this in the future, so far as possible, the United States Department of Agriculture has instituted rigid rulings and inspection of all plant materials imported.

For purposes of scientific investigation, including the introduction and development of new and improved varieties, it is often necessary to introduce plant materials from foreign countries. However, the most rigid precautions must be taken in such cases to prevent the entrance of pests and diseases.

A new procedure for greenhouses has recently been developed and has been put into operation in the Citrus Quarantine greenhouse at Bethesda, Md. This system of "aseptic" plant propagation is described in Department Circular 297. One of its essential features is the double transfer of buds now employed in the handling of all citrus plants. "No part of an original imported plant is ever permitted to leave quarantine alive."



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## Orchard Problems and Their Solution



Edited by Paul C. Stark

### Cultivation of a Young Orchard

I have a small orchard of 100 apple trees now four years old. Should I keep it under cultivation as long as I possibly can or should I stop cultivation?—D. G. L., Pennsylvania.

**T**HE BEST authorities, although differing in opinion on the advisability of cultivating a bearing orchard under certain conditions, all agree that a young orchard should be kept under cultivation until the trees reach fruit-bearing age. The chief reason for this is that young trees should be made to grow fast and hence reach a size sufficient to hold a large crop of fruit as early as possible.

There is no particular age at which cultivation should cease, but this time will probably not be reached before the sixth or seventh year. This, of course, does not mean that it should stop then unless the grower wishes to use the sod mulch system of soil management. What cultivation is done, however, should be done early in the growing season, so a cover crop can be sown in mid-summer which will make a liberal amount of humus and plant food to plow under the following spring.

On very steep land which washes badly, cultivation may have to be discontinued sooner. However, the worst seasons for soil erosion are in the spring and fall, and if a good cover crop is growing, it will protect against soil erosion to a large degree.

### Pruning Two-Year Apple

I am planting an orchard using two-year old apple trees. What is the proper method of pruning for this age of tree, most of them being well branched specimens?—M. A. R., Massachusetts.

**A** TWO-year apple tree when sent out by the nursery is a well branched tree, having been cut back the year previous in the nursery row. The pruning of such a tree is a simple matter, consisting only of cutting off all but three to five scaffold branches and then cutting these back one-third to one-half their length. The ideal arrangement is to have one branch at the top to form the leader (modified leader) and three lateral branches arranged spirally around the trunk to form the balanced framework of the tree. In cutting back these branches, the central one should be left slightly longer than the others.

Owing to the fact that a two-year tree must necessarily lose a good many roots in digging, the pruning required at planting time is consequently more severe than that given at any other time during the life of the tree. Even a one-year tree requires very little pruning when set out, followed by a moderate amount the following year in order to properly shape the tree.

### Pruning of Peach Trees

I have examined my peach orchards and find all of the fruit buds have been killed by the cold winter. Would it now be a good year to give these trees a heavy pruning? Also what fertilizer treatment would be best?—T. E. K., Kansas.

**I**F YOU are to have no peach crop this summer, it would be an excellent time to do as you suggest and give these trees a heavy pruning. This will cause an abundance of new, vigorous fruiting wood to be produced for next year. With this treatment, however, you will probably not find it necessary to use any fertilizer, other than what will be added if you grow a good leguminous cover crop on the

land this summer and fall to plow under in the spring.

In case you are not absolutely sure about all the fruit buds being killed, the best plan would be to delay pruning until after the trees blossom. In this way, even a very small crop could be saved almost in its entirety and the pruning confined to branches or trees without fruit.

### Formula for Grafting Wax

Can you give me the best mixture for grafting wax, one that can be used satisfactorily for use on top-worked trees?—D. C. E., Ohio.

**A** VERY good grafting wax is made by the old formula of four parts resin, two parts beeswax and one part tallow. The resin should be well powdered and the whole combination thoroughly mixed while boiling. After all the ingredients get into solution, the mixture is cooled by pouring into cold water and then pulled like taffy to get the water out.

Grafting wax when once made up will keep for some time and only needs softening by molding with the hands. Sometimes linseed oil is substituted for the tallow, but the latter is usually preferred when it can be easily obtained.

### Vigor in Fruit Trees

Please tell me what is wrong with our apple trees. They do not produce fruit any larger than walnuts any more, the same trees that used to bear large apples. Can you suggest anything that will bring them back to natural size?—H. C. S., Virginia.

**T**HE MOST logical reason for trees bearing very small fruit is the fact that they do not have the normal amount of vigor. This condition may have resulted from the lack of attention, such as regular cultivation, fertilization or even pruning. Trees naturally tend to bear smaller fruit as they get older unless they are kept in a high degree of vigor by plenty of fertilizer and pruning.

The best treatment for your trees would be to give them some nitrogen fertilizer this spring, either in the form of nitrate of soda or sulphate of ammonia. Manure is also valuable, though not as quick-acting as the two nitrogenous fertilizers just mentioned. In addition to this, prune the trees so that plenty of sunlight may reach all parts of the tree. If, after this treatment, the trees set a full crop of fruit, it will be advisable to thin the fruit some time in June. Thinning always pays, not only in increasing the size of the fruit produced, but by eliminating a large part of the inferior and diseased fruit on the tree.

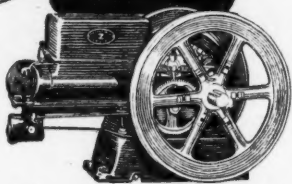
### Prevention of Collar Rot

Will you please tell me if I can do anything for collar rot on Grimes Golden trees, 15 to 20 years of age? Do you advise planting double-worked Grimes Golden trees?—B. C., W. Va.

**C**OLLAR rot is a disease which once contracted by a tree is almost incurable. Sometimes, however, the tree may be saved by bridge grafting, i. e., connecting the roots with the top by insertion of scions, thus bridging the gap where the collar rot occurs. This is sometimes very hard to do, particularly on trees which have been weakened before the collar rot is discovered.

The collar rot disease may be entirely prevented by the planting of double-worked Grimes Golden trees. This is not only the easiest but the best method of preventing the trouble.

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**Banana Growing in Florida**

FLORIDA is known for her citrus fruits and vegetables, but if plans on foot materialize, she may become famous as a producer of bananas also. Within recent years, some bananas have been grown in the state and the results are reported to be sufficiently encouraging to justify the thought that the crop may become commercially important in the future.

The Florida Banana Growers' Ass'n, representing the parties interested in this venture, recently held its annual convention at Kissimmee. About 300 delegates from all parts of the state were present and a most enthusiastic meeting is reported.

W. E. Bolles, secretary, in his annual report summarized the present status of the industry. According to him the acreage has doubled the past few years, and those who are giving the crop proper attention are making money out of it. As yet there has not been a sufficient volume produced to supply the demand within the state, but with the increased acreage in prospect, it is believed bananas will be shipped to other states within a comparatively short time. In view of the fact that 45,000,000 bunches are annually imported into the United States, Mr. Bolles thinks an excellent market awaits Florida growers of bananas. It is contemplated that a state-wide marketing association will be needed to satisfactorily handle the output in 1925, and Mr. Bolles suggested that a committee be appointed to consider plans and make recommendations, profiting to the fullest extent from the experiences and lack of large co-operation on the part of Florida citrus growers the past year.

"The Cavendish, Hart and Ladyfinger varieties are maintaining their lead in popularity. All of them will produce good nine-hand bunches in Florida, weighing 30 to 60 pounds or more, and that is large enough to suit the commercial requirements. We hear our growers once in a while speaking proudly about 100 or 125-pound bunches, which are good for the state and county fairs, and you can all grow them if you will handle them right; but the regular retail trade is all based upon the handy nine-bunch as the standard. The banana crate factories make the crates to suit the average bunch, while, as a matter of fact, about nine-tenths of all the bananas are shipped without any crates and in carload lots. Many bunches of imported bananas weigh less than 35 pounds."

Addresses were also given by T. J. Harris and S. B. Aultman, both of whom spoke at length on banana culture.

A large list of new members was taken into membership. Next year's convention will be held at Winter Haven, in February, 1925.

**Effect of Rootstocks on Growth of Apple Trees**

(Continued from page 7)

ferences in vigor of the seedling root stocks on which the trees were budded. Undoubtedly many other factors influenced the growth of the trees but the variation of seedling stocks is undoubtedly one cause of differences in growth and productivity of both citrus and apple varieties.

The fact that early size differences are relatively permanent would suggest the use of only the best grades of nursery trees. It might also be practical to replace trees which make a very poor growth in the orchard in the first few years. Although the culling of inferior nursery stock and young trees may be of practical value to the grower, it is also essential to determine the factors which cause differences in growth and productivity and to control these factors so far as possible.

He: "Martha, we've got to put a mortgage on the house. Had we better make it \$500 or \$1000?"

Martha: "\$1000, of course; we don't want the neighbors to think we can't afford a large one.—Cappers.



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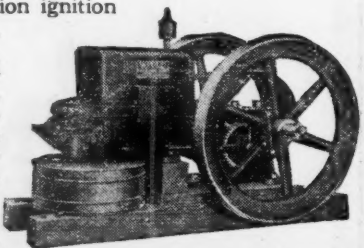
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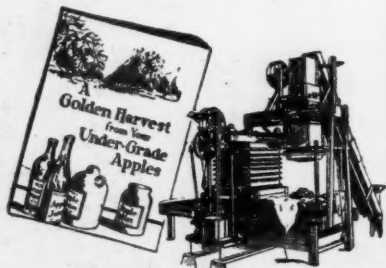
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HYDRAULIC CIDER PRESSES



Edited by C. E. Bassett

**A**BOUT 350 fruit growers, bankers and business men attended the annual meeting of the **Michigan Fruit Growers** at Benton Harbor.

Directors elected for 1924 were Miller Overton, Bangor; J. F. Sigbeem, Benton Center; Allen Graham, Elberta; A. J. Rogers, Beulah; Henry Namitz, Bridgman; P. D. Leavenworth, Grand Rapids; John Bottema, Spring Lake; W. J. Schultz, Fremont; H. W. Goudy, Sawyer; Bart Gleason, Lawrence; Herbert Nafziger, Benton Harbor; M. D. Buskirk, Paw Paw; F. L. Bradford, St. Joseph; David Drake, Fremont; O. R. Gale, Shelby; John Lang, Sodus; Amos Tucker, South Haven, and Clark L. Brody, Lansing.

Special commodity freight rates for Michigan fruits as well as mixed car tariffs will be sought by the **Michigan Fruit Growers, Inc.**, and the **State Farm Bureau** this year.

Michigan fruit shippers are entitled to commodity rates similar to those enjoyed by California shippers, the state exchange declared. The westerners, it was pointed out, have surprisingly low rates on their products considering the great difference in haul to market.

"We have few commodity rates out of Michigan at present," declared General Manager F. L. Bradford. "We have one on grapes to a few points, but only six per cent lower than the class rate. For instance, the class rate from Berrien county points to St. Paul is \$23.90 per ton, while the commodity rate is \$22.10 or \$1.80 a ton less. That is worth something, but the class rate on California grapes to St. Paul is \$71.50 per ton, while the commodity rate is \$34.60, a reduction of 60 per cent or 10 times the percentage of reduction enjoyed by Michigan shippers. What's more, the California commodity rate will deliver grapes to New York without extra cost."

"During the past season," he said, "this commodity rate has saved California growers \$3,000,000. Now they are asking for a further reduction of \$5.80 a ton and expect to get it," Bradford declared as he spurred Michigan shippers to action.

The fruit exchange will set up its own sales service this season. Its experiences with the **Federated Fruit and Vegetable Growers, Inc.**, last season, were said to be far from satisfactory. Several of the leading sales agencies of the country have offered their services. Among these agencies are the **American Fruit Growers** of Chicago, **Berk & Granger** of Benton Harbor, the **Wolverine Fruit Exchange** of Grand Rapids, and the **Florida Citrus Fruit Exchange**.

The offer of the latter organization is said to be most attractive. Its salesmen are idle during June, July, August, September and October, and the exchange is anxious to make outside connections to reduce its operating expenses. The **Michigan Fruit Growers, Inc.**, got a late start in 1923, but succeeded in handling less than 1500 cars. Local managers sold approximately 30 per cent more in direct sales.

**O**VER \$3,400,000 has been returned as patronage dividends to the members of the **Fruit Growers' Supply Co.**, Los Angeles, Calif., during the past eight years. In that period, the company has supplied members with packing-house supplies amounting to more than \$40,000,000, orchard supplies amounting to more than \$16,000,000, and has sold lumber and lumber

products amounting to more than \$13,000,000. In addition, a limited amount of general merchandise has been handled for members. The total of the business transactions of the company for the eight years ending December 31, 1923, was \$66,573,201.

The cost of operating the company during the eight years has varied from 83 cents for each hundred dollars of business in 1917, to \$1.97 in 1922. The output of the two mill plants operated by the company was 105,606,131 feet of lumber in 1923.

One of the achievements of the past year was the refinancing of the company by the sale of bonds to the amount of \$4,000,000. These bonds mature in annual installments extending over 12 years. The capital of the company on December 31 was \$4,621,140.

The **Fruit Growers' Supply Co.** was formed in October of 1907 by the members of locals of the **California Fruit Growers' Exchange**, for the purpose of buying in quantity the supplies needed for orchard and packing house, particularly box shooks. Among the supplies purchased are labels, nails, tissue wrappers, fertilizers, spraying equipment and spraying materials, picking boxes, seeds for cover crops, etc.

The two lumber plants sell lumber, lath and wood, in addition to furnishing the material for the boxes in which the fruit is sent to market. Because of the policy adopted regarding forest conservation and reforestation, it is believed that the timber holdings of the company are sufficient to meet the requirements of the members for shook material for many years to come.

**T**HE NEW prune growers' association of Oregon, which is the result of the re-organization of the **Oregon Growers' Co-operative Ass'n** to handle nothing but prunes, elected officers recently as follows: Seymour Jones, Salem, president; George Zimmerman, Yamhill, vice president; W. I. Staley, Salem, secretary-treasurer; Edwin Allen, Forest Grove; George Neuner, Roseburg; Oscar Haynes, Yamhill; W. M. Elliot and H. S. Butz, Dallas, and R. W. Hinkley, Roseburg, directors.

The new state association expects to take charge of such plants of the **Oregon Growers' Co-operative** as are needed. They plan to finance themselves through a charge of one cent for each 10 pounds of prunes handled for the members. Members of the new association are to be allowed to sell their green fruit in any market or to anyone they may choose, but they must market their dried prunes through the association or pay a penalty of two cents per pound.

**L**INCOLN HUTCHINSON, personal representative of Secretary of Commerce Herbert Hoover, will hold a conference with the **Northwest Fruit Growers' Commission** before he leaves the Northwest. Mr. Hutchinson held a conference with the heads of the **Yakima fruit shipping** concerns in which he discussed in a confidential way the plan which Secretary Hoover has in mind instituting as a remedy for some of the marketing evils recognized by the trade.

**A**VOCADO growers of California have formed a marketing agency called the **California Avocado Growers' Exchange** which was incorporated and



formally organized recently. The following is a list of the officers and directors:

William H. Sallman, president, Chula Vista; John W. Hart, first vice president, Los Angeles; A. F. Yaggy, second vice president, Santa Barbara; George B. Hodgkin, secretary, Monrovia; Gordon F. Blackwood, assistant secretary, Glendora; William D. Stephens, Montebello; E. R. Canterbury, Whittier; J. C. Mather, Pasadena; Percy M. Allen, Los Angeles; James H. Bays, Ventura; C. V. Newman, Tustin; E. C. Dutton, Anaheim; J. S. Watson, San Fernando; A. R. Sprague, Del Mar.

One of the first steps to be taken will be the adoption of standards for the various grades of avocados marketed so that the consumer may be guaranteed only mature avocados. The exchange by-laws call for 12 districts from which 12 directors will be elected annually. These directors will select three directors at large making 15 in all.

The exchange is financed by a combination of small annual dues based on the number of trees owned by each member and a tax on all fruit sold. It is a growers' co-operative non-profit organization modeled after the California Fruit Growers' Exchange, and is unique in that all of its members are members of the central exchange but that voting and elections are by districts.

**THE BOARD** of Directors of the California Fruit Exchange, in session at Sacramento, recently authorized the distribution of \$160,000 to the 6500 member growers. This is the first payment of a four per cent dividend declared by them based on gross sales of approximately \$17,200,000 during the last year. The net earnings of the California Fruit Exchange as announced in the annual report of General Manager J. L. Nagle were approximately \$670,000.

The directors also authorized the renewal of the marketing contract with the California Fruit Growers' Exchange for the coming year, by the terms of which agents of the latter organization handle deciduous fruits on the eastern markets.

**MORE** than 150 members of the Yakima Fruit Growers' Ass'n, Yakima, Wash., attended the annual meeting. The report of the manager showed that the membership had increased from 387 to 537 during the year, and the acreage had increased from 4789 to 6218. The past season was one of large crops and low prices and the association made practically no profits on its operations. However, there was no deficit and the financial condition is considered satisfactory.

The tonnage of fruit made a total of 2587 cars, an increase of 145 per cent over the previous season. The tonnage for the several years of operation has been as follows: 1918, 618 cars; 1919, 938 cars; 1920, 586 cars; 1921, 926 cars; 1922, 1050 cars. Apples and Bartlett pears are handled in the largest quantities, while the association also markets other pears, cherries, peaches, prunes and plums in large quantities, and strawberries, asparagus and apricots in smaller quantities.

During 1923 a large cold-storage and packing plant was constructed at one of the shipping points, with equipment designed to precool 5000 boxes of pears in 24 hours, and with a storage space for 60,000 boxes.

All the storage space of the association was filled to capacity the past season and it was found necessary to store 177 cars in the east. This is the first time this association has ever had fruit to fill all its storage space. With new space secured this year, the association has storage room for 475,000 boxes.

**OVER** a thousand farmers' business organizations recently reporting as to fruit dealings 77 per cent were incorporated; 42 per cent have capital stock; 22 per cent pay dividends on capital stock; 86 per cent

are composed entirely of growers; 81 per cent pay patronage dividends; 96 per cent are co-operative; 65 per cent have contracts with members; 44 per cent advertise the products they are marketing; 72 per cent pool their sales returns; 68 per cent do collective buying. Arranged according to the number of reports received, the leading states are: California, 236; Arkansas, 88; New York, 88; Florida, 82; Minnesota, 72; Texas, 54; Michigan, 52.

During the 10 years, 1913 to 1922 inclusive, the volume of business of the 67 associations which reported for both years increased from \$16,769,000 to \$36,526,000, a gain of 117.8 per cent. The percentage gains for the associations reporting in both years for a number of the states, are as follows:

State.	1913.	1922.	Per cent gain.
California .....	\$6,118,000	\$9,539,000	50
Florida .....	834,000	3,512,000	321
Missouri .....	694,000	2,878,000	314
New York .....	525,000	2,698,000	33
Michigan .....	356,000	2,732,000	667
Arkansas .....	64,000	248,000	287

**REPRESENTATIVES** of seven of the largest fruit packing organizations in the northwest gathered in Seattle recently to open bids for about \$500,000 worth of paper wraps which will be used in handling the 1924 crop. For the first time northwestern organizations are buying their paper collectively, each having always purchased separately heretofore, and, while on this plan they are working together on the purchase, it is understood that each organization stands on its own feet.

They will take approximately 100 cars of paper this year and the orders will be placed on sealed bids. While no decision on the awards was made public, it was stated that wherever the business was placed considerable saving over last year's costs would be effected. The organizations which are co-operating this year in these purchases are the Apple Growers' Ass'n of Hood River; Skookum Packers' Ass'n, Wenatchee; Wenatchee District Co-operative Ass'n, Wenatchee; Wenatchee-Okanogan Co-operative Federation, Wenatchee; Yakima County Horticultural Union, Yakima Fruit Growers' Ass'n and Washington Fruit & Produce Co., of Yakima.

**ONE** OF the most important pieces of work for a co-operative association is to educate its members, and the non-members as well, regarding a lot of important unknown facts. How many fruit growers really know what it has cost them to produce a package of fruit of any kind? In an important recent hearing in Yakima, Wash., with reference to the very important matter of what freight rates boxed apples could stand, only one witness could give any figures as to the cost of producing a box of apples, and his figures were so high that everyone was startled, even though he produced accurately kept books.

But I hear you ask the value of knowing the cost. Would it help me get a better price? Yes, it would. If everyone knew that it cost \$2.50 for every barrel of apples that is offered for sale, do you think any grower would be as liable to accept the first offer a buyer made at a lower figure? In every fruit district there are some spineless growers who get excited the moment a cash buyer appears and, lacking any information as to the crop and market prospects, they jump at the first offer and the market is then and there made for the whole district, and it will take a long time and much effort to overcome these early contract sales. How long could a factory run and prosper if it never kept any cost accounts and sold its goods for the first offer?

Get every grower to keep books on his crops and in time we will eliminate the ignorant careless seller and so make it possible to ask and get a price that will not only cover cost but show a fair profit. As long as there are those who give away their fruit, other growers have little, if any, chance to prosper.



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Single Room with bath	3.00
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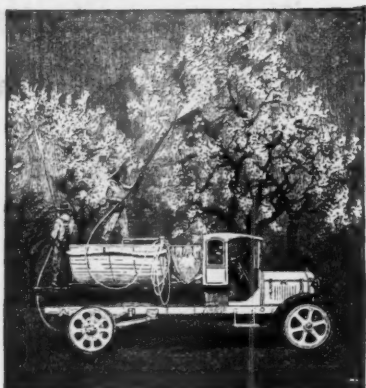
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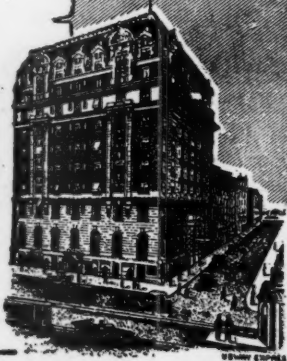
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ABSOLUTELY FIREPROOF



Edited by C. E. Bassett

LAST month it was stated that good marketing consisted in getting a product to the right place, at the right time, in the right amount and in a form and condition to meet the demands of that market. But how is one to tell just where and when a thing is wanted? Only by keeping in touch with the consuming centers and "feeling their pulse" by noting what reaction you can get from your offers of what you have to sell. If offers are prompt and strong, you know that that particular market is the "right place" and it is also the "right time." Sending a shipment of fruit to some market, in the hope of its landing at the right time and the right place, is not much more sensible than it would be for a hunter to go out in the woods at night and shoot his gun at random, thinking he might hit some game.

Before you shoot your fruit to market, be sure that it has the best chance to find a buyer, and that is done by having a buyer before you ship. If we could have our way, there would never be a shipment of fruit on consignment. Indiscriminate consigning causes more demoralized markets than all other methods combined. For years we have been trying to build up an "f. o. b." business for perishable fruits. We want buyers to come to our shipping stations and fill their local needs by cash purchases or by orders to be settled for on delivery. But, if you were a buyer in any market, would you buy fruit "f. o. b." shipping point and assume the transit risks, when you knew that if you would wait a day or so you could buy the same fruit and have the pick of many cars at your own price? Of course you would not, and that is the reason why numerous markets last season never bought a car at shipping point, simply because their own side tracks were kept filled with consigned fruits. If you ever hope to have something to say about what your products will sell for, don't give them away—don't consign them.

**THE NORTHWEST Fruit Growers' Commission** has announced its general plan for organizing the fruit industry of the northwest. The report states: "The program of organization is along the lines of permanency and contemplates building its grower organization solidly over a period of years. The commission goes further than this and recommends an extension of the present market news service of the Federal Bureau of Agricultural Economics to the end of daily publishing information covering the following: Sales as made that day with frequent checks of the order books of the various shippers; number of cars rolling unsold with their market destination; proportion of such cars destined to eastern storage; cars arriving on track waiting sale in principal markets of the United States; daily number of cars cleared for export with their foreign port destination; and daily arrivals in the principal foreign markets. The commission is considering the development of this character of service with federal authorities.

"The commission hopes that a northwest organization of growers may begin with the use of the existing co-operative organizations, building in such a way that will not lessen the degree of success that such organizations have obtained through years of hardship and investment, but that will add to their present strength and efficiency. The structure of the organization consists of:

(1) Local associations of growers for pooling fruit, packing, warehousing and distributing supplies to growers; (2) sub-exchanges to sell the fruit of a group of local associations, and (3) a central exchange to maintain a sales organization in the markets of the world, assemble and disseminate sales information, serve as an advisory sales agency, co-operating with the sub-exchanges in making sales, supervise sales in foreign markets, administer advertising and carry on market exploitation, purchase supplies, and perform all of the many industrial services that should receive the united attention and force of the growers of the northwest.

"In this structure it is hoped that the established grower organizations should take their places as sub-agencies, retaining their sales offices and supervising the sales of their fruit as carefully as it has ever been sold in the past and retaining the old customers with whom their brands are favorites.

"One of the desirable features of the local association from the standpoint of the grower is its genuine democracy. Through it, he has direct control of all those things that can be economically handled in his locality and through joining his association with other localities, forming a sub-exchange, the burden of supporting a sales manager is lessened to a very economical point, and yet allows the sales office to be close to the fruit as it is packed, stored and shipped and to handle a volume that is great enough to make for economy, and not too great to prevent the utmost sales efficiency, they say.

"The sub-exchange is a group of local associations, or it may be a unit group of growers having a number of packing houses and storage plants at different shipping points, and is the office that handles the routings and sales of fruit shipments. Each local association has equal rights in governing its operations and elects one of its members to act on its board of directors.

"The sub-exchange, in order to maintain its sales office economically, should have as a beginning from 500 to 1000 cars of fruit to sell annually. For the best sales efficiency, it is the belief of the commission that such offices should not handle a tonnage exceeding 2000 or 3000 cars annually.

"The commission would not limit the number of sub-exchanges to one for each district. Shipping points like Wenatchee and Yakima would have more than one exchange.

"All unhealthy competition and price cutting between the sub-agencies and the different districts would be eliminated by their being furnished daily with identical sales and market information from the central exchange, by clearing its sales through the central exchange, and by having every district sales manager come under the influence of the sales director of the central exchange, it is said.

"The market intelligence of the central office would be vastly more extensive and gathered from sources that are immeasurably more comprehensive than that found in any sales office in the northwest today or that would be accessible to any sub-exchange manager in the future.

"Constant telephone communication, daily bulletins and frequent meetings of the sales managers of the sub-exchanges would be the means of securing perfect harmony and scientific distribution.

"The central exchange would be a corporation made up of all the sub-



exchanges governed by a board of directors, each member of the same being a grower, one chosen to act in that capacity by each sub-agency.

"Functioning with the board of directors would be an advisory committee of five business men appointed by the president of the board of directors and confirmed by the board of directors, having no power to vote in the organization, but meeting regularly with the board of directors and acting in an advisory capacity.

"The mechanics of handling the sales from the various district offices and clearing through the central exchange are technical matters to be developed by the director of sales in consultation with the experienced district managers.

"Among the functions of the central exchange may be mentioned the handling of supplies, advertising and dealers' service work, standardization of the advertised brand and the maintenance of a terminal sales organization.

"The latter would be started by establishing salaried agencies in at least four of the strategic centers in the east and one in Europe. These agencies would be established to supervise brokers in their districts and to make sales in the cities where located. It is intended that ultimately the exchange would have sufficient salaried agents to adequately cover all available territory.

"The only practicable financing plan for the central exchange is that commonly termed in California as the 'withholding repayable' or the 'revolving fund' plan. Each and every box of fruit would be assessed a fair selling charge every year. Each grower receives full credit on the books of the exchange for the amount of his saving contributed to such a fund, as evidenced by deductions from his fruit which at the end of a period of years these savings begin to revolve back to the grower so that the savings contributed in the year 1924 might be repaid to him in 1929, and so on."

**SIX GRAPE** shipping associations in the Chautauqua and Erie (New York and Pennsylvania) region received a total of \$1,086,152 for the grapes marketed through a joint sales committee the past season. The sales for the season included 1277 cars of grapes and 6,396,659 pounds in trays, which were sold to the grape juice factories. The carlots were sold to 232 customers in 111 cities in 20 states, whereas the 1922 grapes went to but 197 customers in 80 cities in 16 states. The cost of selling was 1.52 per cent of the net sales. The net weight of the grapes sold was 14,959 tons. Of this quantity 74.54 per cent was packed in 12-quart baskets; 21.38 per cent went to the grape juice factories; 2.21 per cent was packed in two-quart baskets; and 1.87 per cent in four-quart baskets.

A central packing house pack was tried out this year, central packing houses being operated at three points. A total of 70 cars of two-quart and four-quart baskets of selected table grapes were shipped. This table stock brought so much better prices than the other grapes that plans are already under way to put a larger portion of next year's crop on the market as table grapes. The standard pack from the central packing houses was advertised in a limited way. The results were such that one of the speakers at the meeting said, "We must advertise our product and then follow up the advertising by furnishing quality as good, if not better, than advertised." As a rule, the pools continued for three days, the pool prices varying from \$59.50 a ton for October 4, 5 and 6, to \$84.70 for October 22, 23 and 24.

Considerable attention was given by those attending the annual meeting to the subject of freight rates on grapes moving eastward from the Pacific Coast and freight rates on grapes moving out of the Chautauqua-Erie region. There seemed to be a feeling that the proposed reduction of rates for California stock should be opposed

unless freight reductions could be obtained also for the Chautauqua-Erie stock.

**THERE** is strong prospect that the New York state apple grading law, which as it stands applies to barrels only, will be changed to include baskets and all other closed packages. A bill has been introduced into the state legislature providing for such an extension. If it passes, it will mark the end of a long fight that goes back several years into apple history.

Under the law as it is now proposed to amend it, grades applicable to barrels will be extended to bushels which must be marked as to variety and contents, with the name of the grower or packer. The face or shown surface of the package must represent the average of the entire contents. As to be expected, opposition to the extension of the law to baskets has developed among the reactionary interests.

**A NEW** agricultural policy is being developed by the British Government. Certain of the proposed measures are summarized as follows in the *Times* (London).

Co-operative enterprises controlled by farmers will be supported and assistance given the societies engaged in the preparation, sale or manufacture of farm products, by providing advances toward capital expenditure.

In the case of existing societies the loan will be made only for the purpose of improving or extending premises and plant, and the amount will not exceed half of the sum required.

In the case of new societies, the Ministry will advance not more than half of the total capital considered necessary by the Ministry, or more than the amount of share capital subscribed by the members, and in no case more than £10,000. Interest will be charged on the loan at the rate of five per cent, the loan to be repayable within a period of 20 years.

**A SHIPMENT** of 200 tons of Colusa prunes a few days ago left San Francisco for Hamburg, Germany. Superintendent Menefee of the Colusa plant of the California Prune and Apricot Growers' Ass'n expects orders within the next several days from San Jose headquarters that will be sufficient to clean up all the prunes of the 80-90 size that are on hand.

A carload of 90-100 size was sent to San Francisco several days ago to be shipped to Rotterdam. The outlook for prices in the dried fruit line this year is good, it is reported.

**ABOUT** \$50,000 was spent this year by the California Pear Growers' Ass'n, San Francisco, Calif., in an advertising campaign to increase the consumption of California Bartlett pears. The crop of pears was no larger than in 1922 but the canneries of the state bought 17,000 tons less than in 1922 and, in consequence, new markets had to be found speedily. For three weeks, in the height of the season, nearly 1000 cars a week were sold. Advertising was limited to a few localities. In the four cities, Boston, Philadelphia, Chicago and Pittsburgh, the consumption of pears increased 119 per cent over 1920, when no advertising was done. In New York City, no advertising was done this year and the increase in consumption was only 46 per cent.

Several important lessons were learned from observations on the eastern markets, among which were the following: Greater care should be given at the beginning of the season not to ship immature pears. A tighter pack of more uniform sized pears is demanded. Greater efforts should be made to build up the smaller markets. A larger association membership is needed. An effort should be made to find jobbers in western territory to co-operate in the expense of newspaper advertising.

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(Pat. Pend.)



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### Origin of a Famous Pear

by H. S. Tillotson

IT IS a curious coincidence that two of the more important varieties of the pear in commerce had their origins within the corporate limits of one city, though in widely separated sections.

Of the original Seckel pear tree, nothing remains. It grew as a chance seedling on the farm of Lawrence Seckel, in a district known as "The Neck," in the southern part of Philadelphia, and made its appearance in the eighteenth century. Regarding the origin of the Kieffer pear, however, there is more definite data.

During the latter part of the last century, Peter Kieffer, an Alsatian horticulturist, conducted a nursery in Roxborough, not far from the famed Wissahickon Creek, in the northern section of the Quaker City, and here he grew a large number of plants of the Chinese Sand pear (*pyrus serotina*) for ornamental use.

In its raw state, the Sand pear, which is almost globular, is hard and undesirable but is said to be very palatable when cooked and spiced.

Among some seedlings of the Sand pear, Kieffer noticed one bearing foliage different from the rest, and it was accordingly isolated. It bore its first fruit in 1873, and this pear was found to possess qualities that have since established it as a good commercial variety. As Kieffer grew his Sand pears near trees of the Bartlett variety, there is little doubt that the Kieffer pear was the result of pollination by the Bartlett.

Peter Kieffer died in 1890 and the place is no longer conducted as a nursery. The property is now owned



The original Kieffer pear tree and part of the Kieffer orchard.

by David Fulmer Keely, a prominent Philadelphia attorney. The site of Kieffer's nursery is away from the main lines of travel, and in a most picturesque section that gives little indication of its being within the limits of a great city. It is on a slight elevation that commands a fine view of a number of large estates and nearby is a well-kept golf course.

Though the Kieffers of commerce possess to a certain degree the "grit" of the Sand pear—and this constitutes, probably, the main objection to the Kieffer—some pears from the original tree, proffered by Mr. Keely, did not seem to have this characteristic to any considerable extent, and I am inclined to believe that the flavor was superior to that of other Kieffers that I have tasted. The fact that these pears were thoroughly ripened on the tree may account in part for their greater palatability.

The original Kieffer tree appears to be in vigorous condition, and still bears heavily, while there are a number of its progeny in evidence nearby.

Kieffer's greenhouses no longer exist, but there still remain many interesting trees and shrubs that were once a part of the Alsatian nurseryman's collection. Near the entrance to the property is a giant beech that is probably more than a century old while at the side of the house is a fine display of rhododendrons and Chinese azaleas.

Marie: "And at the place where I stayed this summer a green young hired hand tried to kiss me. He told me he'd never kissed a girl in his life, and—

Gwendy: "And what did you tell him?"

Marie: "I told him that I was no agricultural experiment station."—*Pac. Rural Press.*



# The Orchard Home Department

by Mary Lee Adams

## Little Children of Labrador

**A**UTHORITIES seek to impress parents and teachers alike with the paramount importance of establishing health habits in young children. Habits of eating the right foods to build the little body steadily in height and weight; habits of daily internal and external cleanliness that shall preserve the body from contamination and self-manufactured poisons; habits of plenty of sleep in airy rooms, and plenty of play in the fresh air.

Mothers who are not fully convinced of the importance of these health habits may find an object lesson in the children of Labrador, poor youngsters who fight a losing battle for health against overwork and under nourishment and insanitary surroundings.

These little ones, we are told, live in small crowded houses in the tiny fishing villages that scatter along the precipitous and jagged coast. The gospel of hygiene and sanitation has not entered there. In order to exclude the biting winds, tiny windows are "securely nailed down." With the fresh air excluded, the close quarters of a small house, lacking in all sanitary conveniences and where water is so scarce that there is barely enough to drink, much less to wash in, create a positive menace to the health of the usually large family.

As for a "balanced ration," such a thing is unheard of and really unattainable. At the best of times, which is the winter season when game is most plentiful, the diet consists mainly of bread and molasses and tea, with the meat of bear, rabbit, beaver, caribou and seal. This is better than the sea-gull, which varies the fish diet of summer.

The inhospitable rocky coast offers no pasture for cattle and the people are too poor to buy and feed cows or goats, so the children struggle on "without milk, without vegetables, without fruit, without cereals." Poverty also demands that they help in earning the scanty living which keeps breath in their poorly developed bodies. They must work too hard and too young—at hauling nets, fishing and hunting, if they are boys, and at carding, spinning and knitting if they are girls.

And here is the report on results which may serve as a warning to some who are disposed to make light of health habits in children. Crowding, lack of sanitation, lack of fresh air, lack of cleanliness in the homes, are visited by a veritable scourge of tuberculosis. Lack of a properly balanced diet for promoting steady gain in height and weight, results in a large number of cases of so-called "diet deficiency" diseases, such as rickets and scurvy.

Loss of sleep and over-exertion, as the children rise early to join in the hunt or in the hauling of heavy fishing nets, or sit up late carding, spinning and knitting, show plainly in heavy eyes and pallid cheeks.

To save our own children from the handicap of poor health, we must aid them in every way in the formation of sound health habits. Let health be their ideal. Praise them when they observe the rules of health and when they make gains in height and weight. Turn their thoughts away from ailments and disease and lead them to dwell on the joy and beauty and usefulness of perfect health.

## Gypsy, Pagan and Christian

**E**VERY autumn the roads in some sections of our country see the annual procession of gypsies wandering, as in times gone by, from place to place. Every country of the world may witness these pilgrimages. For some, the manner of their journeying has changed from afoot and in the most primitive vehicles to automo-

biles. But the swarthy face, the ringed ear, the gay petticoat persist, and so do the nomadic habits (possibly also the thievish habits) of countless generations of gypsies lost in the night of time.

How far these strange people are really affected by the civilization with which they come in contact is almost impossible to conjecture, as was proved recently by the funeral of the gypsy queen Eleanora, wife of King Johns, absolute ruler of a very powerful band of gypsies.

Queen Eleanora was a wealthy woman and owned the home in Baltimore where she died. She wore no gypsy rags, but silks and jewels. A requiem mass was celebrated for her in the Roman Catholic church of St. Jerome, Baltimore. Quite orthodox, you say. But wait a minute. The cortege which bore her to the Christian church, continued, by her request, to Mount Olivet cemetery, Washington, D. C. True it came by motor vehicles, but was accompanied by the very strictest forms of immemorial gypsy funeral rites dating back thousands of years.

The dead queen was decked in every precious article of her attire and all of her earthly possessions were laid in the casket beside her. In addition, the most lavish feast of gypsy delicacies was distributed among the mourners and very choice packages of food were placed around the massive silver casket and buried with the body to sustain it until the looked for resurrection at the end of 3000 years.

Queen Eleanora was born under the shadow of the giant Himalayas of Asia, and her husband, King Johns, is ruler of a tribe of Brazilian gypsies, but the cradle of all the wandering tribes of gypsies is supposed to be old Africa, in that Egypt where flourished the Pharaohs and Cleopatra and where King Tut was laid to rest.

There is a proverb to the effect that if you scratch a Russian you will find a Tartar. Is it true that if you scratch a Christian gypsy, you will find a pagan?

## A Blind Girl's Courage

**T**HOUGHTS of what others have accomplished in the face of extreme difficulty help to keep us from those dangerous moods of self-pity into which we are tempted at times to fall. Louise Moore, who became totally blind at the age of six and one-half years, furnishes an inspiring example, not only of courage and intelligence but of unselfish devotion.

Miss Moore graduated some years ago from Trinity College, Washington, D. C., with the degree of Bachelor of Arts. This achievement would justify most sightless girls in resting on their laurels, but Louise Moore will not be satisfied until she wins the degree for which she is studying, that of Master of Arts in psychology.

This is all fine enough, but far finer is the work the blind girl is carrying on in the interests of those similarly handicapped. Since her graduation, she has actively conducted a tea shop in her alma mater, of which the proceeds to date are \$6000. When she can double this sum, she will establish a scholarship in perpetuity for girls like herself.

It is her judgment that the blind of normal mental development should not be segregated. She points to the fact that she readily kept pace with those whose two eyes served them to no better advantage than did her sensitive fingers in contact with embossed type. Maybe she is too modest when she applies the term "normal intelligence" to her own brain power. Certainly it is not ordinary, and her pluck and benevolence are still more rare.

## The World's Illusion

**N**OT MANY of us orchard women will ever attain great riches. We may be poor in the generally accepted sense. Some of us are even compelled to make use of that old-fashioned member, the human foot, when we wish to flit hither and yon about our neighborhood.

When we achieve a new limousine, we hurry round on a series of calls. How sweet in our ears the hearty exclamations of friends. "My dear! What a perfectly peachy car!" No Rolls Royce, standing before marble-pillared porches, gives so deep a sense of satisfaction.

We may not be rich, yet few of us go hungry or cold. When we stop to think of it, we are among the blessed of the earth. We're apt to be healthy. We're too busy to be bored. Our interests are essentially normal and center about young living things, babies, chicks, puppies, calves and colts, and on growing things, flowers, fruits and vegetables.

We do not worry too much about self-expression. Our children are the noblest form of that. And in all of our interests we have the best partners in the world, our own husbands. It is truly said that a more complete partnership exists between the farm man and wife than between couples in any other occupation or position. They may deserve no special credit for this, the existing conditions of their lives result in this close community of interests, but it is not to be overlooked when weighing human values.

In early life, looking forward, we see things far away and bright. There's a dazzling radiance ahead. It looks golden. Perhaps it is gold, we think, that gives such a wonderful glow to all things it touches. We do not realize it is hope and youth that gild the future.

And in age, looking back over the long road, on what does the gaze linger most tenderly? Is it on the summits of worldly success that may have been scaled? No, deep in some humble valley of love, are folded away the sweetest memories. There were passed the days one would live over again.

Far away down the track of the years, in that simple home nestling among the apple trees, a child was born. An eternal fragrance hovers over the spot. And yonder where, as you see, the road runs steep and difficult, you stretched out a hand to one who, through weakness, was like to go over the cliff.

Do you feel the danger and weariness of that road now? Your gaze rests exultantly upon it. You recall it only as the point, the glad point on the way, where a friend was joined to you. A friend who, perchance, has never left you but still goes along with you. And friends grow rarer toward the journey's end.

## These Things Endure

Love and friendship and an eternal sympathy with nature, these are the things that endure. An old man, always simply dressed, invariably wearing a flower in his coat, speaks to me often of the pleasure he gets out of the birds and squirrels that flit and creep to his window sill to be fed.

That window sill is in a magnificent mansion, but its chief value to the old millionaire lies in its serving so admirably as a table for God's little creatures. He's taming them so that when his grandchildren come to visit him, they may enjoy watching them. Flowers, birds and children, these things are within reach of most of us, and they overshadow the old man's millions as he draws near his journey's end.

He's old and we are young. The world's illusion still glitters in our eyes. Well, blink at it a while longer. When you wish to learn just how for-

tunate is your lot, read that mighty epic, *The World's Illusion*, by Wassermann.

Or rather don't read it. It is a painful work. It's far from Sunday School reading and it leaves an oppression as of nightmare. One thing, however, that the author plainly shows, is the utter moral disintegration that takes possession of any class of people who, titled or wealthy, consult nothing but the whim of the moment, their immediate pleasure. The only inheritor of immense riches whom Wassermann deigns to redeem, is he who, satiated, renounces his wealth and casts in his lot with those whom we sometimes, in our self-righteousness, call "scum of the earth."

We think we'd use our wealth, if we had it, for the good of others. Perhaps so. The Bible says it is easier for a camel to pass through the eye of a needle than for a rich man to enter the kingdom of heaven. Not that it's impossible for him to do so. The eye of the needle was but a narrow gateway in Jerusalem through which a loaded camel might manage to squeeze. So when we find a person burdened with riches, who is yet unspoiled, we think him very worthy of praise.

On this spring morning, as you look out on the freshening grass and see the budding lilacs, doesn't your heart sing for joy? Don't you feel a gladness closely akin to the happy song of the brook released from the icy silence of winter, sweetly attuned to the whispering of young soft leaves? Would you exchange this simple gladness and kinship with nature for bright lights and the roar of cities, for the society of profligate European capitals or the empty life of so many of our own possessors of unbounded wealth?

It happened to me last week to sit at dinner with three heavily jeweled women from three of our largest cities. Theirs had been the opportunity to behold and to have all that heart could desire. Yet their eyes were restless and unsatisfied, their faces hard and strained. They were not evil, but they had long lived at "the pace that kills" the spirit.

## One Who Was Born Again

A story, true although it never happened, is told of a woman who stood gazing at the long, low hills before her. They bounded her vision. She turned to the sea, and the thin horizon line was drawn like wire across her sight. She gazed up into the sky. Surely that was far away and high. But when she raised her hand it touched the sky.

Then she uttered a frenzied cry for further sight, and she was granted infinite vision. With it came infinite pain. The agony of the whole world was hers. At last her spirit, tortured beyond endurance, craved only the peace of the grave.

This, too, God granted her. How restful it was to lie in the cool, dark earth. How soothing the sound of the pitying rain upon the sod that lay above her. How kind of the rain to come to visit her who was so alone in the quiet grave.

And now perhaps, the rain was passing and the sun laughing out over the fragrant earth. Ah! to breathe that fragrance once again. Oh God! how could she bear it? Nevermore to see the blue sky, the silvery spring, the gold of autumn. All the "multi-colored, multi-form, beloved beauty" over her. Oh God! to be alive again.

So the poet, Edna St. Vincent Millay, tells us that the woman was brought back to life and lay once more upon the bosom of the friendly earth. Springing up, she gazed enchanted upon the things that once seemed to bind and oppress her. Thus, in part, she voices the rapture of her discovery:

God, I can push the grass apart  
And lay my finger on Thy heart!  
The world stands out on either side  
No wider than the heart is wide;  
Above the world is stretched the sky  
No higher than the soul is high.



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Home of Theodore Engelhardt, San Antonio, Texas, warmed by ARCOLA with an American Radiator in each room.

ARCOLA and American Radiators have done all of that and more, testifies Mr. Theodore Engelhardt, whose home (pictured above) is in San Antonio, Texas.

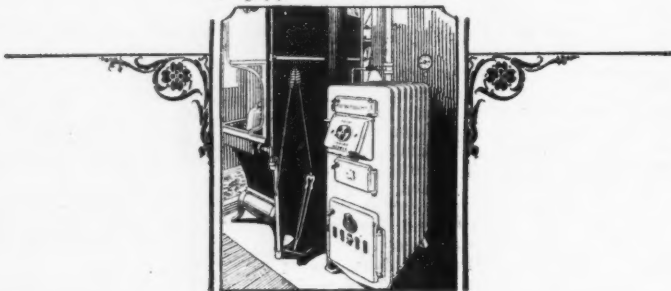
The house has no basement. The Engelhardt household had to be content with stoves—until ARCOLA came; imagine his delight to find that ARCOLA warmed the entire house on fuel that he formerly burned in one stove.

All the drudgery of running up

and down stairs is eliminated, for ARCOLA is set in the kitchen. Connected by pipes with an American Radiator in each room, it furnishes even, hot-water warmth.

Mr. Engelhardt says he would never again be without an ARCOLA in a small home. If you are planning to build, why shouldn't you enjoy radiator warmth when ARCOLA is so inexpensive and so economical of fuel? Send today for the attractive book that tells all about it.

ARCOLA in the kitchen sends its warmth through pipes to a radiator in each room.



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Used for SEALING, GRAFTING, PRUNING AND BUDDING TREES

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75c postpaid. Dunlap, \$2.75; 1000: Gibson, \$3.50; Aroma, Glen Mary, Premier Gandy, Wm. Belt, Campbell's Early, Collins, \$4.00; Crampton (Latest) \$7.00; World's Wonder Bubach, Prime, Big Late, \$4.75; Cooper, \$9.00; Champion Everbearing, \$9.00; Black Raspberries, \$12.00; Concord Grapes, \$22.50. Any following \$1.00: 25 Raspberries, 15 Grapes, 5 Currants, 75 Asparagus, 16 Iris, 36 Gladioli, 12 Horseradish, 15 Rhubarb, 4 Bridal Wreath, 12 Privet Hedge, 6 assorted Flowering Shrubs. Catalog. KIGER'S NURSERY, SAWYER, MICH.

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is the advice the Horticulturist is now getting from nearly all authorities on orchard fertilization. To grow profitable crops of apples and peaches use

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## CHATS WITH FRUIT GROWER'S WIFE

By HAZEL BURSSELL



## Simple Home Weddings

JUNE is the month of brides. Perhaps your Daughter is this June leaving the shelter of the parental roof—going forth with high resolve, courage and love in her heart to join hands with her Chosen Mate, that they too may build a Home in all the sacred meaning of the word.

Weddings from time immemorial have been joyous occasions. But to the Mother there is always a suggestion of sadness at the thought of losing her daughter, mixed with the pleasure and excitement of planning for the Big Event. Nevertheless, she should enter into the plans wholeheartedly, coming forward with timely suggestions.

Possibly your daughter is one of those young ladies to whom weddings are merely "a heap of bother," who would very much prefer to merely go to a Justice of Peace or a minister and "have it over with." You, as her mother, should talk to her, telling her what the memories of a lovely home wedding, even of the simplest, will mean to her in later years. Tell her that you want her to have all the splendid things you missed. Besides, marriage vows taken in the presence of friends and relatives should be less easily broken. What of a little extra effort or expense? It is an occasion that comes but once in a life time!

### Make Plans Early

The parties concerned should begin early to plan for the wedding and all details should be carefully worked out. It is with the hope of helping the mother and daughter solve some of their problems in arrangement that this article is written. No discussion of the more elaborate church wedding is included. Those who prefer and can afford a church wedding are referred to any good etiquette book for details.

A home wedding may be simple or elaborate, also, depending on the taste and pocketbook of the bride and her family. For the more elaborate wedding engraved invitations should be issued to the guests two or three weeks in advance. Any high-class stationer will gladly show you the correct types of invitations. For the informal wedding, friendly little notes are correct.

On the receipt of an invitation, the guest who wishes to send a gift should do so before the wedding, sending it to the bride's home in the name of the bride. The cards that come with gifts should be kept until the bride has made note of them for her "thank-yous." The thank-you notes should be personal and sincere, each one having an individual note. The gifts may be on display in a separate room during the wedding, but all cards should be removed.

### May Use the Lawn.

If the house is not large and there is a nice big tree-shaded lawn surrounding it, why not have the ceremony on the lawn? An evergreen screen could be put up to give privacy, an altar of flowers and ferns could be constructed, a ribbon aisle laid off for the bridal party and seats arranged for the guests. The arrangements could be very beautiful. Each girl bride should use her own ingenuity to make her wedding as perfect as possible.

The hour of the wedding is for the bride to choose. She may have it at High Noon, in which case the guests would be served with a "wedding breakfast" following the ceremony. It might be at four o'clock. Evening

weddings should be formal affairs, the women of the bridal party wearing evening gowns and head ornaments, and the men wearing dress suits from top hats to patent leather shoes.

For an outdoor wedding, the bride would be lovely in a white organdie and lace gown. She may or may not wear a veil of tulle. If the veil is to be worn with a wreath, it should be mounted in advance in a becoming manner on an elastic band or gauze cap, above which is fastened the bridal wreath of orange blossoms. It is the privilege of the girl bride to wear all white, but no other member of the bridal party may do so, neither may a woman at her second marriage wear white. If there is a flower girl, she should be sweetly befringed and should carry a basket of rose petals or small flowers. The bridesmaids—there may be anywhere from one to a dozen—wear gowns, slippers and hats alike, made in the delicate shades of pink, rose, blue, pale green, maize, etc. There is a strong prejudice against mauve or lavender, beautiful as these colors are, for there is a superstition that any shade of violet is unlucky at weddings. The bride's attendants always wear hats at a daytime wedding.

For an informal wedding, the bride may prefer to wear her going-away suit. In that case she would wear a hat and corsage bouquet. She would not have more than one attendant—a maid of honor. The bridegroom would then have a best man, but no ushers. The ushers correspond usually to the number of bridesmaids, and are needed only at large formal weddings as a rule.

### Decorations Simple

The decorations for a home wedding should not be overly elaborate. The most suitable spot in the living room for the altar should be transformed into one by the use of flowers, ferns and palms. Flowers may be also massed in appropriate places about the room. If convenient, an aisle may be marked off by white ribbon for the bridal party on its way to the altar. White lilies, white lilacs, white roses or seasonal flowers make effective decorations. Seats will be arranged facing the altar. The bride's family will be seated on the left, with the groom's on the right. The bride's mother will have the seat of honor.

Lovely music, vocal and instrumental, should precede the ceremony. The bride may choose from among her friends talented musicians or singers to play or sing numbers she may select. The "Bridal Chorus" from Lohengrin is most popular as a wedding march.

The first to come in the bridal train is the flower girl, followed by the ushers (if there are any) in pairs, next the bridesmaids, by twos, armed with flowers, then the maid of honor or matron of honor, and finally the bride on the arm of her father.

### Rehearsal Is Necessary

As they near the altar the bridegroom steps forward—he and the best man having entered from the side while all eyes are bent on the bride's entrance. The clergyman, too, conveys the effect of having miraculously appeared in his place. The bridesmaids form at the left of the bride in a semicircle, opposite the ushers at the right of the bridegroom. There may be neither ushers nor bridesmaids at an informal wedding. The maid of honor is at the bride's left ready to hold her bouquet at the fate

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ful moment when the ring is being slipped on her finger. The best man stands at the right of the bridegroom. A careful rehearsal of the ceremony should be staged before the wedding, so that all will go smoothly.

When the minister asks, "Who gives this woman away?" Dad replies "I do," and then steps back to the front seat beside Mother, while the bridegroom carries on.

If there is a flower girl, she leads the procession away from the altar, scattering flowers on her way.

The minister should be first to extend good wishes to the newly wedded pair, followed by the mother of the bride and the mother of the groom. Congratulations are given the groom, while the bride receives good wishes from her friends.

The wedding breakfast will follow the ceremony. For a home wedding, all who were guests at the ceremony will be present at the breakfast. The guests may be seated at tables, or served buffet style. If many of the guests come from a distance, it is more practical to serve them a real dinner in the country, though for newspaper announcements it would still be a "breakfast" or "supper."

#### Bridegroom Provides Flowers

The bridegroom supplies the flowers for the bride. The type and size of the bouquet will depend on the simplicity of the wedding and the bride's attire. With a white gown and veil, they are, of course, white in the form of a shower bouquet. If the bride has chosen to wear her going-away suit for the ceremony, they may take the form of a lovely corsage bouquet. The bridesmaids' flowers are usually provided by the bride's family.

It has long been a tradition for the bride to toss her bouquet from a place on the stair to her girl friends below. The one who catches the bouquet, tradition says, will be a bride within a year. Often the bouquet is made in several parts so that it may be divided among the wedding party.

## Wedding Cake Recipes

THERE are two types of wedding cakes, the white "bride's cake" and the rich fruit cake, or "wedding cake." The bride's cake is more informal and is cut by the bride for the guests. The wedding cake is often done up in small boxes, tissue-wrapped and be-ribboned, a box to each guest. It, of course, may be cut and served at the wedding breakfast or supper, as is the bride's cake.

#### White Fruit Cake.

- |                      |                      |
|----------------------|----------------------|
| 1 c. butter          | 2 T. orange juice    |
| 1 c. sugar           | 1 t. vanilla         |
| 2 c. flour           | 1 t. lemon or orange |
| 2 T. rice flour or   | extract              |
| cornstarch           | 1 lb. sliced citron  |
| 1 c. egg whites      | 1 lb. blanched al-   |
| 1 t. baking powder   | monds                |
| 1 lb. sliced candied | 1 lb. sliced candied |
| cherries             | pineapple            |

Have loaf-tin lined with greased paper, double thickness being used on the bottom. Have the flour sifted with the baking powder several times, sifting once before measuring. Clean the fruit and cut it up and measure out all ingredients. Cream the butter but do not "oil" it, or the fruit may sink in the cake. Beat again with the sugar, add one egg white and the flavorings, with just enough flour to preserve the creamed butter consistency. Beat well. Beat the other egg whites separately until stiff. Add the fruit to the butter mixture and then fold in the stiff egg whites and stiff egg whites, alternately, using about half at a time. Place the batter in the tins, leaving a hollow in the center. Bake in a steady "loaf bread" oven.

#### Dark Fruit Cake.

- |                       |                       |
|-----------------------|-----------------------|
| 1/2 c. shortening     | 1/2 c. molasses       |
| 1/2 c. dark brown     | 1/2 c. coffee         |
| sugar                 | 2 eggs                |
| 1/2 c. seeded raisins | 1/2 c. flour          |
| 1/2 c. currants or    | 1/2 t. soda           |
| seedless raisins      | 1/2 t. salt           |
| 1/2 c. mixed candied  | 1 t. cinnamon         |
| peel, cut very        | 1/2 t. nutmeg or mace |
| small                 | 1/2 t. cloves         |
| 1/2 c. dried dark     | 1/2 t. allspice       |
| cherries or prunes,   | 1 t. grated orange    |
| cut fine              | or lemon rind         |
| 1/2 c. nut meats      |                       |

Prepare raisins by washing, drying and cutting in small pieces. Cut up other fruits, and measure out all ingredients. Sift the flour once before measuring and sift several times with the salt and soda. Put into a pan the prepared fruit, sugar, shortening, molasses and coffee. Bring to the boiling point, and then cool. When cool, but not quite cold, beat in the spices and the egg yolks. Then fold in alternately the stiffly beaten egg whites and the flour, sifted with the salt and soda. Place the batter in a baking pan lined with two folds of greased paper. Bake about 95 minutes or 1 1/2 hours

Besides the bride's bouquet, the bridegroom pays for the ring, the minister's fee, the license, his attendants' ties and gloves, if he has ushers. He also customarily gives the bride a present of jewelry and bestows on the best man and ushers tie pins or cuff links.

The bride's family pays for the invitations and announcements, the decorations, for any conveyance for the bride or bridal party, for the bridesmaids' flowers and for the wedding breakfast, supper or reception.

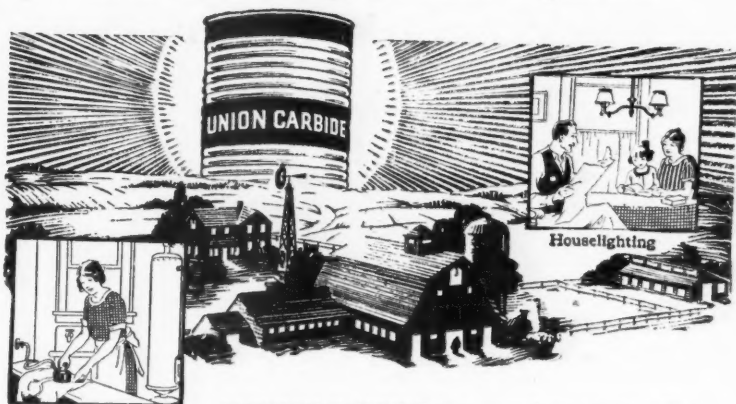
During the reception, after the ceremony, the bride slips away to change for traveling clothes. The groom also changes, if it is necessary, at the bride's home. The best man looks after the baggage, tickets and reservations for the bridegroom, turning over the tickets before the departure. Friends and relatives should say good-bye at the bride's home and not follow the young couple to the station, thereby making them conspicuous. Throwing rice and tying old shoes to their conveyance, supposedly to bring them luck, is no longer considered proper. A few grains of rice may be mixed with flower petals or an old satin slipper may be thrown as the couple leaves the house, to carry out the tradition. The destination of the young people is usually kept a secret.

#### Announcements Sent Friends

It is a lovely custom to send engraved announcements to all absent friends and acquaintances. These should be all addressed, stamped and sealed ready to send either the day of the wedding or the day following. The correct forms for announcements will be displayed by good stationers. The bridegroom sends a list of persons who are to receive announcements or invitations to the home of the bride, together with necessary addresses. Don't forget to mail the announcements while in the midst of sweeping up cake crumbs and confetti the day after the ceremony!

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## Kansas joins the movement

**G**OVERNOR Jonathan M. Davis of Kansas, a practical farmer himself, realized that the increased use of electricity will lower farming costs, reduce the time required for handling crops, and lighten work in the dairy, barn and home.

He called a meeting on February 5, at Manhattan, Kansas. A group of farmers and engineers was organized to co-operate with the National Committee now studying farm electrification.

The organized groups of farmers in Kansas and other states are demonstrating the new uses to which electricity can be applied and establishing the principles on which a sound electrification policy must be based.

Governor Davis thus indorses the plan:—

"I have made an investigation of this movement and have every reason to believe that those who are backing it are sincere in their efforts to do something of a constructive nature looking to the betterment of the economic condition of the farmers of the country. I would like the Kansas group to work in harmony with the other state organizations to the end that we may get the benefit of all possible information on farm electrification."

When the facts are gathered and interpreted farmers who are still dependent on animal and human labor will know how to utilize electricity profitably. And farmers who already receive electric service will learn how to make greater use of it.

The National Committee referred to by Governor Davis is composed of economists and engineers representing the American Farm Bureau Federation, the Department of Agriculture, the Department of the Interior, the Department of Commerce, the Power Farming Association of America, the American Society of Agricultural Engineers, the National Electric Light Association.

A booklet has been published by the National Committee. Read it and pass it along to your neighbor. It will be sent on request free of charge. Write for it either to Dr. E. A. White, American Farm Bureau Federation, 58 E. Washington St., Chicago, Ill., or to the National Electric Light Association, at 29 West 39th Street, New York City.

## NATIONAL ELECTRIC LIGHT ASSOCIATION

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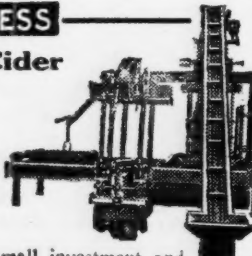
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## Three Years' Work With Lubricating Oil Emulsions

by W. P. Flint

University of Illinois

**F**ROM about 1918 to 1922, there was an alarming increase of San Jose scale throughout the large southern and western Illinois orchard districts. Despite the fact that nearly all of the orchards in these districts were sprayed with lime sulphur, the scale continued to increase, and in 1921 and 1922, many acres of commercial orchards were killed.

In the dormant season of 1923, most of the badly infested orchards in southern Illinois were sprayed with the oil emulsions with very satisfactory results. This spray is now being used almost exclusively in the southern and central Illinois districts at present for the dormant spray.

The work in using the lubricating oil emulsions for the control of San Jose scale was first started in Illinois in March, 1922. Two different brands of oils were used; both of these were of the grade which is usually sold for stationary gas engines. The oil emulsions were made according to the formula which had been worked out by Mr. Yothers in Florida, where similar emulsions have been used for treating scale on citrus trees for a number of years. Several of the more widely used miscible oils were compared in these tests with the home-made oil emulsions; liquid lime sulphur at strengths of one to eight, and one to four, for 32 Baume material; dry lime sulphur; and several of the more widely used commercial sulphur preparations. The results of these experiments showed that the home-made lubricating oil emulsions were practically equal to the best commercial miscible oils and gave a much better kill than was obtained from any of the sulphur compounds. These experiments were carried on in a large commercial orchard at Olney, Ill., this orchard having been regularly sprayed with lime sulphur for at least 10 years previously, and for the two years preceding had received two applications of lime sulphur, one in the fall and one in the spring. San Jose scale had increased to such an extent that several acres of trees had been killed and the whole orchard had been weakened and so reduced in vitality that only a small crop was being produced.

Lime sulphur at one to four failed to give better than a 90 per cent kill of scale, while the lubricating oil emulsions and some of the miscible oils gave better than 98 per cent kill. Other experiments were carried on in Illinois during the spring of 1922, and throughout that summer, to test the possibility of using the home-made oil emulsions during the growing season. Several of the larger grovers made tests along this line in their own orchards, and while the results obtained showed that applications made at this time would hold down the increase of scale during the summer, it was apparently impossible to get a satisfactory clean-up from the summer treatment.

Further experiments were started in the fall of 1922 and continued through that winter. Many commercial growers whose orchards were being seriously damaged by scale, encouraged by the results obtained during the previous year, treated their orchards with the lubricating oil emulsion during the dormant season of 1922 and 1923.

Several hundreds of thousands of gallons of lubricating oil emulsions were used in southern Illinois orchards during this period. Much of this material was made in local plants by men who had had no previous experience in manufacturing this spray solution. A special effort was made to check up on the results obtained in these orchards. Only one man out of the several hundreds using this spray for the first time failed to get results which were satisfactory. In this case, the application was not made in a thorough manner, and a complete clean-up of scale could not possibly have been obtained regardless of the

(Concluded on page 38)

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## Principles and Practices in Small Fruit Culture

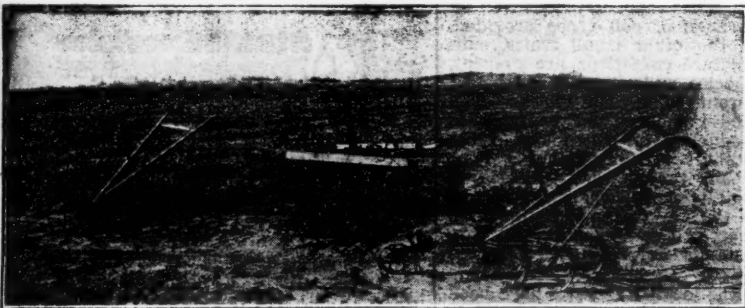
Edited by Dr. A. S. Colby

### Moisture Conservation in the Small Fruit Plantation

ONE OF the most important needs making for success in growing small fruits is in recognizing the importance of conserving the moisture supply. Much of the precipitation common during the fall and winter months either runs away on the surface or is wasted by evaporation early in spring. Soil moisture is lost rapidly where there is no protective mulch or where a competitive crop of grass, weeds or small grain is allowed to grow. Small fruits average over 95

tensively grown in the northern half of the United States, east of the one-hundredth meridian. West and south of these limits their culture is restricted, unless some method of irrigation is practiced. The long hot summers of the southern states are not favorable for their growth. Gooseberries seem to endure summer heat and drought somewhat better than currants.

The raspberry is a native of the northern states, where it is found



Tillage tools commonly used in strawberry cultivation.

per cent water. Good crops of quality berries are directly proportional, other things being favorable, first, to the moisture supply in the soil in close proximity to the roots, and, second, to the supply of plant nutrients which that moisture can place in available form for the rootlets to absorb. The soil must be handled in the most suitable way from the standpoint of its physical condition throughout the season.

The time to begin to think about moisture supply and the principles underlying its conservation is before the locality is selected for growing certain

growing wild. Commercial plantations of cultivated varieties are seldom found south of the 36 degree latitude. In some sections of the north central states, the canes must be protected from the cold, drying winds of winter by a covering of soil or straw.

The blackberry is grown all over the United States, excepting in southern Florida, the colder sections of the north and north central states (unless protected in winter) and the hot arid sections of the western states. The dewberry is another native of America and is grown to some extent in most of the states where the blackberry is



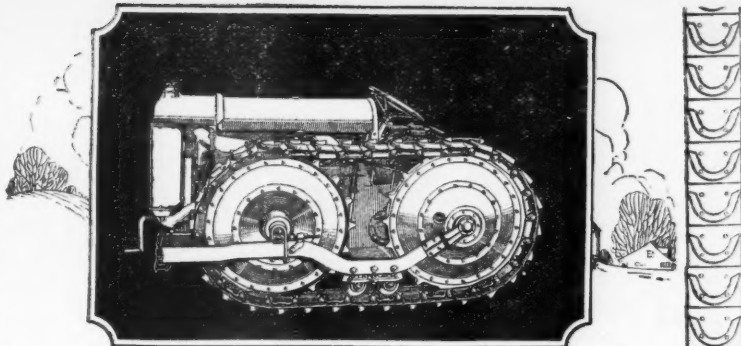
Good tillage in a one-year-old vineyard with the vines properly staked to allow for cultivation.

kinds of small fruits and before the site in that particular locality is chosen.

Some of the climatic requirements of the most important small fruits should be mentioned, with their bearing on moisture conservation. Currants and gooseberries, being natives of cool, moist climates, are most ex-

found. Mild climates, with protection from severe winter conditions, such as drying winds, are most favorable for dewberry culture.

The great number of species and varieties of grapes available to the small fruit grower makes it possible to grow this fruit almost anywhere in the country by choosing those most adapt-



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When you equip your Fordson with Johnson TRACKPULLS you automatically place this wonderful little machine in the same class as "crawler" or "track-laying" types of tractors that cost more than twice as much as the Fordson. The TRACKPULL-Fordson compares in all mechanical details with the highest-priced crawler tractors made today.

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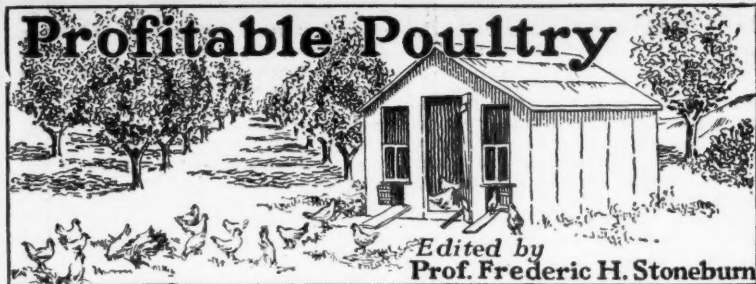
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## Profitable Poultry



Edited by  
Prof. Frederic H. Stoneburn

### Keep the Pullets Growing

THE YOUNG pullets in the present broods of chicks will, if properly handled, be the steady layers during the fall and winter months when eggs bring the top prices of the year. It pays to give them every advantage so they may grow steadily and reach laying maturity with strong bodies and well developed internal organs, which will function properly and not weaken when working under high pressure.

Continuous, unchecked development from hatching to laying age is to be desired. A brief period of neglect may slow up the whole brood, give it a setback from which it may never entirely recover. And the owner will pay dearly for his neglect.

The usual flock of chickens contains practically equal numbers of pullets and cockerels. It is good practice to separate the sexes early, and if there are more males than will be required for home use, sell the surplus as broilers. But if broiler prices are too low to be interesting, have more chicken dinners. The average farm family could well use more chickens. This delicious and nutritious meat can be grown at less cost per pound than the butcher charges for meats which are inferior, and it is not true economy to trade the home-grown chickens for something of less value.

Cockerels intended for home use should be given quarters separate from the rest of the flock, with roomy yards so a certain amount of exercise may be secured and growth continued. A week or so before killing time, the required birds should be closely confined in small pens, kept as quiet as possible and fed heavily a ration containing a high percentage of corn. During this brief period of special feeding, the use of a moist mash is advocated, either exclusively or in conjunction with cracked or whole corn. Give milk to drink, if possible. Thus the young birds will become fat and soft fleshed, fine in flavor, and greatly superior to chickens which are taken direct from the open range when wanted for table use.

Those who grow the heavier breeds, as Rocks, Reds, Orpingtons and Jersey Giants, may well caponize the surplus males for later use or sale. By early winter, these capons will be big, meaty birds and will sell at a high price. This is a splendid plan for those who have a supply of home-grown corn. The capon ration may, if balanced with greens and animal food, contain a large amount of corn, and the growing of capons affords a most profitable market for the corn crop.

If cockerels are to be grown for use as breeders the following year, make the initial selection when the sexes are being separated. Handle the birds individually, examine each one critically, and so determine which are worthy of being retained for breeding purposes. Select double the number which will be actually used, to make good any losses and permit further selection when maturity has been reached. Choose those which promise to be of satisfactory breed type and color, which are strong, vigorous and healthy. These are characteristics which should be transmitted to succeeding generations.

Put these choice young males in a house by themselves, with full opportunity to range and develop strong constitutions. If they prefer to roost in the trees instead of the house, per-

mit that. After they are well feathered, they will not be injured by the summer rains, and the fresh air treatment will do them a heap of good. Some of the best chickens I ever raised roosted in apple and peach trees from May to September.

To the end that they may build strong bodies, feed these future breeders liberally. Give plenty of heavy oats in some form, but not too much corn. In this case you want bone and muscle, not fat.

The usual plan is to separate the sexes after the brood has been weaned and no longer requires the brooder. Weaning age varies according to the breed, the season of the year and the rate of growth. Let the chicks determine this point. Watch them and be guided by their actions.

As the coats of feathers develop and the nights begin to get warm, a few chicks will move away from the brooder and settle down outside the heated space immediately around the machine. A precocious individual or two may even go to roost on a feed trough or other low place. This is the sign that the first roosts are needed. Place low roosting frames along the sides or at the rear of the brooder house. The size must be determined by the space available. They are made by setting narrow boards—four to eight inches wide—on edge and tacking lath or other narrow strips thereon, a few inches apart. Inch-mesh wire netting may be stapled across the top and open ends, before the roosts are attached, to prevent any chicks from huddling underneath.

Since these little roosts are low and conveniently located, the chicks which do not feel the need of the heat will soon learn to use them. Others will quickly imitate their example, and soon the greater part of the brood will be found on the roosts every night. Fire may be kept in the brooder for a short time thereafter, merely to keep the house warm, and then the machine may be removed or the flock transferred to other quarters.

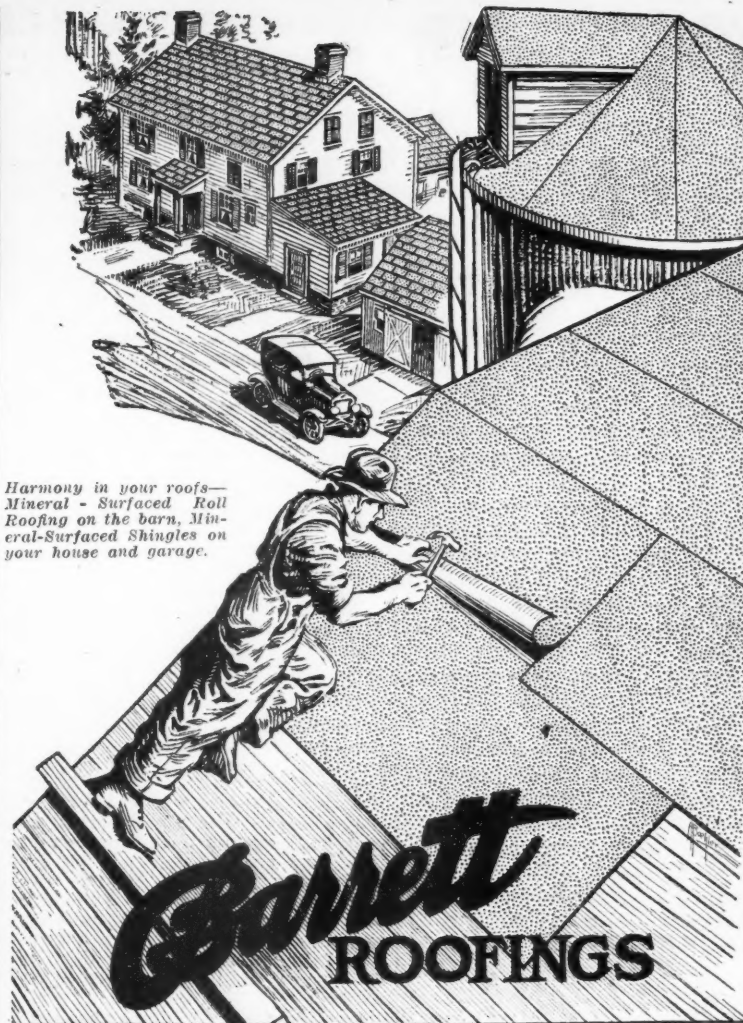
This plan of roost-breaking the youngsters early has two advantages. It helps to prevent losses due to chicks piling up in the corners of the brooder house after they have begun to leave the brooder, and also heads off the same trouble when they are changed to new quarters. Put a hundred young pullets, unaccustomed to roosting, in a strange pen and many will be crushed before the flock learns to use the roosts. But if they have learned, they will naturally take to the roosts in their new homes and there will be but little of the dreaded crowding and piling up.

If it can possibly be arranged, move the weaned pullets to fresh ground, that upon which no poultry has ranged for at least a year. In this way one may largely avoid the dangers of certain diseases and parasites which are due to contamination of the soil.

Give the future layers the greatest possible freedom. Let them range at will so they may secure lots of exercise and lay up a reserve of health and strength. If the flock must be confined in yards, make these as roomy as possible and cultivate them frequently.

Avoid overcrowding of the houses. Keep the flock comfortable. When determining the size of the family to be placed in a given house, make due

(Concluded on page 37.)



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## Treatment of American Foulbrood

by H. F. Wilson

THERE is only one principle necessary in the eradication of American foulbrood and that is to destroy every living germ in a hive and eliminate all source of infection. A study of conditions within a diseased colony shows that the adult bees are not affected and do not carry the disease except in the distribution of honey which contains the bacteria or spores. When all infected honey is removed from a colony of bees, the disease disappears. A certain amount of diseased honey is carried over by the bees from the old hive to the new, but this honey is consumed before new brood is developed, and danger of infection from this source is very slight. Many beekeepers attempt to treat the disease by cutting out individual cells containing dead larvae, but experience shows that success is almost never obtained in this way.

Most beekeepers are very reluctant about destroying old combs or frames and oftentimes attempt to save dry brood-free extracting combs because they cannot see anything wrong with them. However, in many cases, very small amounts of honey may be left in some of the cells, and when new honey is put on top of these, they break way from the cell wall and become mixed with the food in the cell. Unless all sources of infection are completely removed, it will be impossible for the beekeeper to get rid of the disease. For this reason, he should not attempt to save any combs that have been on infected colonies unless they have been treated with some sterilizing agent. The hive bodies, covers, and bottoms, however, may be saved, and if given a good wash with strong lye water there is no danger of infection from that source.

Scorching frames, a practice now being followed by most beekeepers, is not the most satisfactory way of getting the disease out of the colonies, and the beekeeper should never use a hive body from a diseased colony without scraping and cleaning the combs. Special care should be taken to clean off all honey from behind the rabbets. If the honey is completely removed, there is practically no danger of reinfection from that source.

### Preventing the Disease

Every beekeeper should be careful to inspect each colony several times a season to see if any signs of disease are present. If dead larvae are found, a section of the comb containing these should be immediately cut out and sent in to your state apary inspector. He will then be able to tell you which disease is present, and you can follow out the treatment recommended for each particular disease. In case you have American foulbrood and have made up your mind to take these precautions during the treatment, be very careful in all manipulations during the treatment. Do not expose diseased combs or honey where other bees can reach them. You must remove all infected honey from the colony and place it where it will not provide a new source of infection. Thoroughly clean the extractor and floor of the extracting room after extracting diseased honey. Be careful not to leave infected honey on the floor, so that hive bodies can come in contact with it after they have been cleaned.

### Time to Treat

Bees may be successfully treated during the period of the honey flow, but the most desirable time is shortly after the beginning of the main clover flow. This is usually in June. Diseased colonies found after the honey flow should be left over and treated in the late fall and fed sufficient sugar syrup to carry them through the winter. Plan your work and have your hive bodies all ready so that every diseased colony in the yard can be treated on the same or following day.

Then extract the honey and melt up the combs or sterilize them immediately. Do not let them sit around in the honey house as they are a continuous danger of infection to your entire yard.

Diseased colonies that are weak at the end of the honey flow should be destroyed at once. As soon as the disease is found close the hive, carry it into the cellar and destroy the bees and combs immediately. Also see that none of the bees escape after they are in the cellar, for bees loaded with honey fly back to the old stand. When they do not find the old home, they will go to the nearest hive and are likely to be allowed to enter.

### Method of Treatment

Regardless of the plan to be used, the principle is the same in every case—removal of infected honey and disease-bearing combs. After trying several methods of accomplishing this and observing the results, the following method seems to be the simplest and safest if carefully done.

**First**—Colonies that are known to be diseased should not be given extracting combs prior to the treatment. If colonies have been supered and the bees have built comb between the frames, lift off the extracting supers. Then starting with the one next to the brood chamber, draw a knife between each frame and separate it from the next. Do not do this until the super is placed back on the hive. The operator should carry a can of steaming hot water with him and drop the knife into the water while moving the supers. Be careful not to allow any honey to drop outside the hive. This operation should be done the day before treating so that the bees will clean up the edges of the comb. The job of treating will then be less messy and the chances of dropping honey outside the hive will be greatly reduced.

**Second**—Select an empty hive body that is bee-tight and nail a tight bottom to it. Then place a cover on it that can be moved freely back and forth when diseased combs are being put into it.

**Third**—If the colony is only of medium strength, use one brood chamber with full sheets of foundation; with unusually strong colonies, use two. Place an empty super on these to brush the bees into.

**Fourth**—Place the hive body which is to receive the diseased combs to the left and rear of the colony to be treated, and put the supers of foundation and empty super at the left of the diseased colony.

**Fifth**—Now lift the diseased hive from the bottom board and place on a tight fitting board at the right of the old stand. Then place a queen excluder board on the bottom board still on the old stand and set the clean hives and super on top of the queen excluder. The excluder will help a great deal to keep the bees from absconding.

**Sixth**—Slide the cover of the diseased colony slightly to one side. Then lift out a frame and stand it on top of one of the frames below the empty super into which the bees are to be brushed. The bees may then be brushed off, no honey will be thrown onto the frames and less honey will be carried into the new hive than when the bees are shaken from the frames. As soon as the bees are brushed from the comb, place it in the hive body at the left and cover.

If more than one hive body was on the diseased colony, stack them one above the other with a bee-tight board below and the cover above. When the frames from one body have been removed, shift the empty body to the top of the hive body now holding the diseased combs and use it to hold the next set of frames.

**Seventh**—As soon as a colony has been treated, remove all infected combs to the storeroom before treating the next colony.

**Eighth**—Do not wait until fall or winter to melt up the wax and clean the combs. Do it at once. Otherwise you are almost sure to have your yard accidentally reinfected before fall.

Even with the most careful treatment, reinfection may appear in a few colonies either the same or following year. These should be treated or destroyed as soon as a few cells appear.

## Moisture Conservation in the Small Fruit Plantation

(Continued from page 32.)

easier to work down in spring. Again, cultivation must be begun as early in spring as the ground can be worked and not neglected at any time throughout the summer until the cover crop is sown.

Cultivation should be shallow and the ground must be left smooth and level. Where deep cultivation is practiced and deep furrows left by the tillage tools, the roots are injured by actual bruising and breaking and the moisture supply is lessened through easy evaporation from the edges of the furrows. Crown gall, a serious bacterial disease and a limiting factor in raspberry growing, is a cultural disease favored by deep cultivation. The bacteria living in the soil attack the roots of the plant, especially where broken by tillage tools.

Tillage is the generally accepted method of soil management, especially in large plantations, but as a practice, it is often sadly abused. It is often begun too late in the season and carelessly done at irregular intervals. It does not pay to attempt to grow small fruits under those conditions.

A careful study of the root systems of small fruits is essential before recommendations can be made as to the correct tillage practices. Bearing on this subject, a study made at the Urbana, Ill., Station of the rooting habits of grape vines of representative varieties showed that eight-year-old vines had made considerable root growth. For example, a vine of the Clinton variety examined revealed a root system with a feeding radius of 21 feet nine inches and with a depth of six feet. Other varieties extended deeper into the subsoil, as the Herbemont, with a feeding depth of nine feet one inch. It is concluded with the preliminary evidence at hand that a number of present cultural practices in the vineyard need modification. Deep cultivation, especially near the trunk, inevitably breaks off or injures lateral anchor roots. Cultivation, however, is needed nearer the trunk than with most large fruit plants because of the numerous feeding roots close in.

Mulching is generally understood to apply to the use of some loose material on the ground to prevent evaporation of moisture and keep down weeds. Materials used include straw or strawy manure, hay, leaves or a crop grown on the ground and allowed to remain there. Mulching is advisable on steep hillsides, where soil washing would occur, and in small areas, such as the farm fruit garden, where cultivation is seldom properly attended to. Some small fruits, such as currants and gooseberries, succeed better where a mulch is used, a practice resulting in a cooler soil. The leaf spots also appear to be somewhat easier to control on these plants grown under a mulch.

Sufficient material must be used, six to eight inches at one time being applied. As the mulch works down and adds plant nutrients to the soil, it must be replenished. One application cannot be expected to last more than two years. It should be applied in winter or very early spring. Do not wait until much of the soil moisture has evaporated and mulch in June.

Experiments at the Illinois Agricultural Experiment Station show that mulching red raspberries increased the crop 52 per cent. The berries were larger and more firm than from unmulched rows. Mulch was placed only on the rows. Shallow level cultivation was carried on between the rows.



## Keeping the Hens in Production

by H. A. Bittenbender

**I**F A HEN is to lay a goodly number of eggs, it is absolutely essential that she produce eggs during the winter and summer months and not only during the spring. It is the purpose of this discussion to bring out some of the phases of management that will make it possible for the production of a larger number of eggs during the summer months.

### Housing

Oftentimes we notice throughout the country, chickens roosting in the trees. A look into the chicken house will prove to us the wisdom of the hen in leaving the chicken house and going to the trees. If proper health of the hen is to be maintained, it is necessary that the house be cool, well ventilated, clean and free from pungent odors. If droppings are allowed to accumulate in the house, or broken eggs are not cleaned from the nest, it affords the best kind of a breeding place for the little red mite that visits the hen, obtaining its existence by sapping blood from the hen. The prevalence of these mites can be noticed in the morning by observing the cracks, the bottom and edges of the roosts and roost supports. In the morning, these little fellows will be filled with blood. They can easily be driven from the house by thorough cleaning out of the breeding places. Follow the cleanup with a thorough application of crude oil or stock dip, mixed in equal parts with kerosene or gasoline. In place of the crude oil, drippings from the gas plant or the crank case drainings can often be purchased from garages. Frequent applications with the paint brush will keep down the mites. It must be kept in mind that the mite breeds and lives in the chicken house, and in order to be eradicated, the house must be treated. It gets its existence by frequent visits to the hen at roosting time or when she is on the nest laying or setting.

During the hot summer weather the cracks, crevices and corners should be observed very frequently for these mites. The entire life cycle of the mite is complete in eight to ten days, so that unless some measure of eradication is provided, it is not long until the house is badly infested.

The treatment for mites will not eliminate the lice which stay on the hen. The use of sodium fluoride, either as a dip, one ounce to one gallon of water, or application by the pinch method, is satisfactory. Mercurial or blue ointment can be used. There are other louse powders and ointments that are satisfactory. Recently there has appeared on the market a number of remedies to be placed in the drinking water for the elimination of lice and mites. The Experiment Station does not endorse these remedies, although many of the salesmen are making statements to that effect.

### Summer Feeding

During the spring months on the average farm, there is an ample supply of succulent green feed and a variety of grains. With this abundance of feed and a natural season of production, many eggs are secured, but with hot weather coming on, the chickens do not range as far. There is not the quantity of feed to be secured. With a natural falling off of the food supply, the egg production drops considerably. Broodiness becomes more acute, and it is not long until very few eggs are obtained. To prevent this condition, it is necessary to provide an ample supply of the proper kind of feeds. It has been found that grains alone will not furnish the hen with sufficient material to produce a large number of eggs. With the grains should be fed some animal protein.

The animal protein may be supplied either in the form of meat scraps, tankage, buttermilk in its various forms (dried, fresh or semi-solid) and skim milk. Where the protein is supplied in the form of tankage or meat

scraps, 15 to 20 per cent should be added to the ground food and placed in an open self-feeding hopper and fed dry. Where dried buttermilk is used, 10 to 15 per cent may be added to the dry ground mixture. If semi-solid buttermilk is used, it may be fed either in the paste form or mixed in the proportion of one pound of semi-solid to from five to eight pounds of water, this given to the birds as a drink. Fresh buttermilk or skim milk can also be supplied in the liquid form as a drink. In order to supply a sufficient amount of animal protein, it may be necessary to withhold the water entirely or control the amount of drinking water to some extent.

We believe that the skim milk should be fed sour. Extreme care should be exercised to keep the vessels clean that are used for the feeding of the buttermilk or skim milk. Where a sufficient quantity of buttermilk or skim milk cannot be provided, some tankage or meat scraps may be used in the mash.

The experiment stations have found that where no animal protein is fed many hens do not lay at all throughout the winter and fall months, and those that do lay lay at a slow rate of speed and are not profitable on such a mash. The addition of the animal protein will mean from three to four times as many eggs at practically little or no additional feed cost. It has been found that tankage and meat scraps are about equal in feed value, although the meat scraps usually cost a little more per ton.

Excellent results have been obtained with the following mash: Equal parts by weight of ground corn, ground oats and flour middlings. To this may be added the kind of animal protein that is available.

If there is not an ample supply of grain on the farm, some whole grain can be supplied either morning and evening or only in the evening. It is a good idea to keep rather a close record of the amount of mash that is being consumed. If the flock are not eating heavily of the mash, the trouble usually is that they are getting too much grain. The supply of grain should be limited so that they will consume nearly as much mash as whole grains.

From one and one-half to one and three-fourths pounds per bird per week is about the average consumption of feed. If they are eating about three-fourths to seven-eighths of a pound per bird per week of mash they are obtaining about the right amount of grain. It is not a good idea to feed too much grain in the morning. The heavier feed can be given in the evening.

A scratch grain can be very satisfactorily made up of two parts corn and one part of oats mixed together. If the birds do not relish the oats, the palatability can be increased by either boiling or soaking. Care should be taken that the oats do not sour.

I believe that one of the most common causes of low egg production in farm flocks during the summer months is lack of protein in the feed and also a mash feed.

It is well to take care of the broody hens every night and put them in comfortable quarters. In this way they are easily broken up.

According to a statute recently passed by the State of Virginia, the marketing contracts of agreements of co-operative associations with their members must be registered with the clerk of any court in the State in the office of whom deeds are admitted to record.

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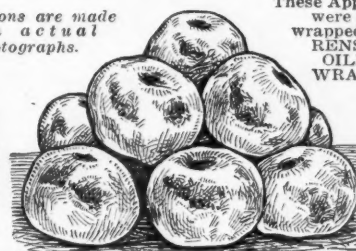
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19 5 4 1 14 7 9 22 5 14

Can You Solve This Puzzle? The alphabet is numbered—A is 1, B is 2, etc. What two words are represented by the figures? (19 is letter S). SEND NO MONEY—just write the two words and your name and address. Contest closes July 7, 1924.

Send Answer Today Besides Sedan we give away Phonographs, Bicycles, Watches, etc., and hundreds of dollars in cash. EVERYBODY WINS! Nothing difficult to do; all can share in Cash and Prizes. You can win the Sedan and bring to you and your loved-ones the joys only a Sedan can give. SEND YOUR ANSWER TODAY and get our amazing Sedan offer.

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You Can Win a Sedan Surely you want this latest model Ford Sedan. Write me today.



## The REGISTERING Piano

The Gulbransen Registering Piano of today is the world's latest achievement in musical instruments.

It stands absolutely alone in the artistic results it produces and the ease with which they are obtained. It is played by music roll and pedals, as are other instruments of its type, but there the similarity ends.

The Gulbransen registers one's exact "touch" on each note. It can be played with all the feeling, the life,

the delicacy of the very finest piano music you ever listened to.

You can graduate the exact shading of each note, not just play it loudly or softly, but graduate the tones just as the most accomplished pianists do in hand-playing.

Ordinary hand-playing can no longer be compared with Gulbransen-playing. Only the most artistic piano playing can be placed in the same class as correct playing of the Gulbransen.

### Nationally Priced

Gulbransen cash prices listed in the back of the Gulbransen Piano Book. Ask for details of the convenient time-payment plan.



GULBRANSEN COMPANY • CHICAGO

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# GULBRANSEN

## The Registering Piano

Registers YOUR TOUCH • Registers YOUR TIME • Registers YOUR EXPRESSION

Because these are facts, we are insistent that the Gulbransen be not confused with other instruments of the same type. We challenge investigation of it as an Easy-To-Play Registering Piano that registers your exact touch, that registers your time, that registers your expression.

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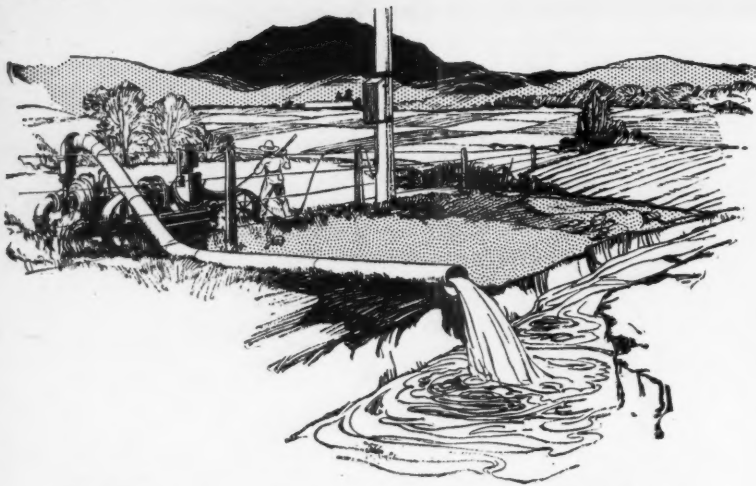
☐ Check here if you do not own a piano.  
☐ Check here if interested in buying piano or action installed in your piano.

Write your name and address in margin. Mail to Gulbransen Company, 3234 W. Chicago Ave., Chicago, Ill.

"Easy to Play" Gulbransen Trade Mark

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Irrigation by electrically driven pumps has made hundreds of thousands of acres of desert land in the Intermountain West blossom like the rose.



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(P-C Benzene) 1-lb. \$1; five pound tin, \$3.75; with directions. From your dealer; post paid direct; or C. O. D.  
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A Practical, Proven Power Cultivator for Gardens, Suburbanites, Truckers, Florists, Fruit Growers, Nurserymen and Lawn work.  
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See people and objects miles away just like they were close. See Moon and Stars as you never did before. Brass bound, useful and entertaining. "Could tell color of aeroplane 4 miles away" — Mrs. Yarbrough.  
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SPECIAL OFFER. Send just four cents. On arrival pay postman \$1.00 plus four cents postage. Satisfaction Guaranteed or money back.  
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## BETTER HOME DEPARTMENT

### Refrigeration on the Farm

by E. W. Lehmann

TO PREVENT the food from spoiling and to keep the milk fresh and sweet becomes a problem in nearly every farm home as the warm summer days approach. The fact that the ice man does not appear each day and deliver an amount of ice in the ice box in accordance with the sign in the window, the problem is not as easily solved in the country as in town. Many simple devices are resorted to in solving this problem: For those who can afford it, the small individual refrigerating plant makes it possible not only to keep food perfectly, but small quantities of ice can be made and tasty desserts can be frozen.

The simplest method resorted to, to keep the cream sweet, is to let it down into a cistern or well. This is not as satisfactory a practice as it might seem. There is always danger of spilling a bucket of cream in the cistern or well which would contaminate the water, and in addition there is danger of contamination getting into the cream bucket. If the cellar or basement is cool, a dumb waiter operated between the kitchen and cellar may be used. In some homes a pit or well is dug, into which the food is lowered. These cooling wells are best when lined with a large clay tile or with cement. By constructing a shaft from the kitchen above to the pit, and by having a cupboard at the top of the shaft, in the kitchen, into which the dumb waiter may be raised, it becomes a piece of labor-saving equipment which should be found in many homes. Such a piece of equipment must be carefully constructed so it will be well ventilated and easy to clean.

The iceless refrigerator is another device that is recommended by the United States Department of Agriculture for farm homes where ice is impossible or difficult to obtain. It is described in Farmers' Bulletin Number 927. This type of refrigerator depends on the principle of absorption of heat by water evaporation as the means of cooling. This principle can be easily demonstrated by wetting one's hands and waving them in the air. As the water dries, there is a feeling of cold experienced. For every pound of water evaporated in this way, the same amount of heat is absorbed from the surrounding air as would be absorbed from a fire in evaporating a pound of water in a pan placed on the stove. To appreciate this principle as a method of cooling, it should be remembered that for each pound of water evaporated an equivalent amount of heat is absorbed as required in cooling about three gallons of milk from 90 to 50 degrees Fahrenheit.

Such a contrivance will not only serve as a cooler for the milk, but will serve to keep meat, fruits, vegetables, etc. On account of the fact that milk absorbs odors so easily, it is desirable to have two of these refrigerators where considerable milk is to be handled.

As constructed, this device is essentially nothing more than a frame work built up and covered with wire screening through which the air can circulate. The shelves are also made of a wire netting of some sort so as not to interfere with the air circulation. A pan is placed at the top and bottom and the outside covered with cotton flannel, smooth side out. Details of construction are given in the bulletin

mentioned above. To operate this refrigerator, the top pan is kept filled with water. The upper end of the cloth covering is placed in the pan of water and it acts as a wick, keeping it saturated. The evaporation of water from the cloth cover lowers the temperature inside the refrigerator.

The refrigerator or ice box is a satisfactory method for keeping food where ice is stored or can be secured reasonably easy. The box should be amply large to hold 100 to 200 pounds of ice. It should be well insulated, carefully constructed, so as to have tight joints at doors, to prevent air leakage, and designed so there is air circulation within the box, thereby making better cooling conditions. It should be provided with a drainage outlet, with suitable trap to avoid air leakage at this point. The inner walls of a refrigerating box should be as near non-absorptive as possible. This means that it is best when lined with metal well enameled. If the box is lined with wood, it should be carefully painted and enameled.

The small automatic refrigerating plant now on the market for use in individual homes is proving satisfactory. In principle, these plants are the same as the large refrigerating plants for making ice. The small plant for home use, however, is entirely automatic in its operation and it is fool-proof. About the only attention required is an occasional oiling. When electric power can be bought at as low a rate as five cents or less per kilowatt hour, the cost of operating such a plant is little, if any, more than the cost of ice, and the chore and muss incident to handling ice are eliminated.

The success of a small refrigerating plant is dependent to a great extent on the refrigerating box in which it is installed. Some manufacturers will sell their plant to be installed in the box already on hand, other manufacturers provide their own box. The latter installation is more expensive than the former due to the high class box furnished by the manufacturer. Any prospective buyer of such equipment who expects to use the box in the home must be sure it is first-class and in the very best of condition to get the greatest satisfaction out of the refrigerating unit installed. As stated by one manufacturer, "Every refrigerating machine is capable of accomplishing only a certain amount of refrigeration. For this reason, a machine cannot operate with the same degree of success in all types and sizes of ice boxes. Further than this, it is impossible to foretell exactly what results will be obtained. Not enough refrigeration is the possible result. A perfect refrigerating machine installed in an improperly insulated ice box cannot produce satisfactory results." This statement is quite true, and since it is true, the man who installs such equipment in his own ice box should be sure that the company making the installation will assume the same responsibility for successful operation as if they had furnished the box.

The automatic feature of the small refrigerating plant will maintain a more uniform temperature than when ice is used. A lower temperature can also be had, and a big advantage is the dry air. Provision is made for freezing small cubes of ice for tea or drinking water, so ice in small quantities is available with such a plant.

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## Classified Advertising

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15c a word. Count each initial, abbreviation, number or group of numbers as one word. Write advertisement on separate sheet. No display type or illustrations permissible. Cash must accompany order.

**SPECIAL NOTICE**—All advertising copy, discontinuance orders or change of copy intended for the Classified Department must reach this office by the 15th of this month for next issue.

#### FARMS AND ORCHARDS

**APPLE ORCHARD**—IN BEAUTIFUL WESTERN North Carolina—the Land of the Sky—24 miles from Waynesville, thirty miles from Asheville on State Highway. 93 acres—4000 trees. Irrigated crop 15,000 bushels or more. Winesaps, York Imperials, Albemarle Pippins, Rome Beauties, Staymans, Red and Golden Delicious. Most conveniently situated orchard in Western North Carolina. Tractor used on most of orchard. Beautiful mountain scenery, pure water, dry, bracing air, high elevation, delightful year-round climate, cool summers, mild winters. New 2-story bungalow with running water and electric lights. New, modern, government specification cold apple storage, tenant houses, barns. Very complete machinery and equipment. Price to June 1st, Fifty Thousand Dollars. Address Manager, Box 344, Waynesville, N. C.

**FOR SALE**—EIGHTY ACRES ON THE FAMOUS Valley Pike in the beautiful Valley of Virginia. Nine miles north of Staunton, a city of about 18,000 people. Three-quarters of a mile from railway station, churches, schools. Has forty-acre apple orchard of varieties such as Delicious, Grimes Golden, Jonathan, Gano, Winesap, Stayman, Winesap, York Imperial, 12 years old. Eight acres Winesap and Stayman, 8 years old. Twelve acres peaches, 1 year old. Good seven room stucco house and good bank barn. Everything in first class condition. Terms to suit any reasonable purchaser. Price \$35,000. Address: Ridgewood Farm, Charlotte, Virginia.

**VIRGINIA APPLE ORCHARD**—ONE OF THE finest in the East, for sale by owners because of other business interests. Ideal location, 107 acres, one mile from historic Winchester, the heart of the famous Shenandoah apple belt. Superior varieties, full bearing. Own cold storage, packing house, and by-products plant. A complete high-class proposition with profitable special markets. Ridgewood Orchard, Winchester, Virginia.

**FOR SALE**—COMMERCIAL APPLE ORCHARD. 30 miles from Detroit, Mich. 700 bearing trees. Spys, Steels Red, Baldwins, Snovs, Good roads. Adjoins two beautiful lakes. 1/2 mile from freight depot. One block from Detroit interurban. Wonderful opportunity for real estate development in near future. For particulars address J. H. Outcheon, owner, 1903 Adelaide St., Detroit, Mich.

**FOR SALE**—A ONE HUNDRED ACRE APPLE orchard situated in the Spokane Valley, about 15 miles from the city of Spokane, Wash. Has about 7000 trees fourteen years old. In good condition, irrigating ditch and laterals, house, barn, horses and equipment on property. Over \$60,000 has been spent on the orchard. For further particulars address Sherman Sanford, Seymour, Conn.

**WANTED**—LARGE FARM WITHIN 3 HOURS of New York; in mountains; suitable for fruit; large house, attractive, good repair; off main road, away from village or neighbors; stream for small hydro-electric plant if possible. Address E-18, American Fruit Grower Magazine, 53 W. Jackson Blvd., Chicago.

**FOR SALE**—ESTABLISHED, PAYING NURSERY business. Will locate in Florida. Kiger's Nursery, Sawyer, Michigan.

**WANTED**—TO HEAR FROM OWNER OF FARM or unimproved land for sale. O. K. Hawley, Baldwin, Wisconsin.

**FOR SALE**—PRUNE AND POULTRY FARM, 15 acres. No agents. Joseph Mully, Gaston, Oregon, Route 1.

**FARM WANTED**—FROM OWNER; WRITE IMMEDIATELY. Raymond Smith, Maplewood, Missouri.

**FARM WANTED**—IMMEDIATELY. SEND PARTICULARS. Mrs. Roberts, Box 73, Roodhouse, Ill.

#### REAL ESTATE

**FLORIDA AND PROSPERITY**, 10 ACRES, \$25 cash. \$25 monthly (\$80.00 per acre). Choicest Indian River fruit land, including Palm City building lot and share in hotel. Write for particulars and bank references today. E. M. Cleveland, Palm Beach Co., Palm City, Fla.

**HOW DOLLARS GROW FROM REAL ESTATE**. Send for this interesting investment booklet. Mailed free without any obligation on your part. Address J. F. Walters Co., Dept. 1, 917, Consolidated Bldg., Los Angeles, Calif.

#### NURSERY AND SEEDS

**20,000,000 FROST-PROOF CABBAGE PLANTS**. Tomato, Pepper and potato plants. Leading varieties labeled, postpaid, 200, \$1.50; 500, \$1.50; 1000, \$2.50. Express, 1000, \$2.00; 5000, \$8.00. Order today, satisfaction guaranteed or money refunded. Omega Plant Company, Omega, Ga.

**TOMATO AND SWEET PEPPER PLANTS** hardy and stocky, 100, 75c; 500, \$2; 1000, \$4. postpaid. 5000 lots, \$2 per 1000, expressed collect. M. Atkinson, Sumrall, Miss.

**CUMBERLAND AND BLACK PEARL RASPBERRY** plants, \$6.00 per 500; \$10.00 per 1000; \$40.00 per 5000. Wm. Mandel, Nurseryman, Bloomington, Ill.

**4,000,000 NORTHERN GROWN STRAWBERRY** Plants. Read our display advertisement on other page. Kiger's Nursery, Sawyer, Michigan.

**BLACK RASPBERRY PLANTS**—CUMBERLAND, Plum Farmer, Kansas, \$12.00, 1000. Large supply. Kiger's Nursery, Sawyer, Michigan.

**CONCORD GRAPES**—1 YEAR, WELL ROOTED plants, \$22.50, 1000. Large supply. Kiger's Nursery, Sawyer, Michigan.

**ORNAMENTAL SHRUBS**—LARGE SUPPLY, 15 assorted, \$2.00. Kiger's Nursery, Sawyer, Michigan.

#### HELP WANTED—FEMALE

**EARN MONEY AT HOME** DRAWING SPARE time painting lamp shades, pillow tops for us. No canvassing. Easy and interesting work. Experience unnecessary. Nileart Company, 2266, Fort Wayne, Indiana.

**WANTED**—WOMEN—GIRLS. LEARN GOWN making at home. Many Spring openings. \$35.00 week. Learn while earning. Sample lessons free. Write immediately. Franklin Institute, Dept. K547, Rochester, N. Y.

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**EARN \$110 TO \$250 MONTHLY. EXPENSES** paid as Railway Traffic Inspector. Position guaranteed after completion of 3 months' home study course or money refunded. Excellent opportunities. Write for Free Booklet G-100. Stand. Business Training Inst., Buffalo, N. Y.

**MEN—WOMEN, 18 UP WANTED.** U. S. GOVERNMENT jobs, \$100 to \$250 month. Steady work. Life positions. Paid vacations. Pull unnecessary. List positions free. Write immediately. Franklin Institute, Dept. K104, Rochester, N. Y.

**MAN WANTED BY LARGEST CONCERN OF ITS** kind. Part or full time. Experience unnecessary. Our men getting up to \$200.00 weekly. Lowest prices. Red Seal Coal Company, 282 Coal Exchange Bldg., Chicago.

#### AUTOMOTIVE

**AUTO OWNERS! GET YOUR TIRES FREE!** Be our Factory Agent! Big spare time money-maker! Sample tires furnished. No capital or experience needed. Write today. Armour Tire & Rubber Co., Desk 619, Dayton, Ohio.

#### PATENTS AND TRADE-MARKS

**"PATENT PARTICULARS" AND ADVICE ON** trade-marks, free. Write. Sterling Buck, W-629F, Washington, D. C.

#### AGENTS WANTED

**WE WILL PAY YOU AT THE RATE OF \$8.00** per barrel selling quality lubricants to auto and tractor owners, garages and stores. In small towns and country districts. Best selling season of year at hand. We have been in business 40 years. The Manufacturers Oil and Grease Company, Dept. 11, Cleveland, O.

**AGENTS—QUICK SALES, BIG PROFITS, OUT-**fit free. Cash or credit. Sales in every home for our high class line of Pure Food Products, Soaps, Perfumes, Toilet Articles, etc. Write today for money-making plans. American Products Co., 1083 American Bldg., Cincinnati, Ohio.

**AGENTS WANTED—MAKE \$25 TO \$50 A WEEK** representing Clows' Famous Philadelphia Hosiery, direct from mill—for men, women, children. Every pair guaranteed. Prices that win. Free book "How to Start" tells the story. George Clows Company, Desk 11, Philadelphia, Pa.

**ATTENTION—AGENTS! BIG MONEY MAKING** proposition. Mozart Field Rug, guaranteed made of entirely new felt. Rapid seller. 100% profit. Sample prepaid, \$1.75. Write today for full particulars. Malsie-Payne Mfg. Co., 20K Sudbury St., Boston, Mass.

**BIG MONEY AND FAST SALES. EVERY** owner buys Gold Initials for his auto. You charge \$1.50; make \$1.55. Ten orders daily easy. Write for particulars and free samples. American Monogram Co., Dept. 92, East Orange, New Jersey.

**USE OUR HANDSOME CATALOG; GET ORDERS** from every home for Dr. Blair's famous home products. Liberal pay. Dr. Blair Laboratories, Dept. 530, Lynchburg, Va.

**EARN \$25 MONTHLY, SPARE TIME, WRITING** for newspapers. Exp. unrec., details free. Press Syndicate, 979, St. Louis, Mo.

#### CHICKS

**QUALITY CHICKS AT LOWEST PRICES.** 15 leading varieties. From best laying strains. Satisfaction guaranteed. Postpaid, 100% live arrival guaranteed. Bank reference. Write for our big free illustrated catalog before ordering. Lindstrom Hatchery, Box 453, Clinton, Mo.

**DAY OLD CHICKS FOR SALE—STRONG** hatched, healthy chicks. Thousands per week at low prices. Circular free. Old Hensty Hatchery, Dept. G, New Washington, O.

**CHICKS, 8C UP, C. O. D. ROCKS, REDS, LEG-**horns and Mixed, 100% delivery guaranteed. 19th season. Pamphlet. C. M. Lauver, Box 85, McAllisterville, Pa.

**BABY CHICKS—8c UP. 14 PURE BREEDS.** Catalog free. Missouri Hatchery, Box 629, Clinton, Mo.

**CHICKS—LEADING VARIETIES. OUR BIG** illustrated chick book free. Comfort Hatchery, Windsor, Mo.

#### INCUBATORS

**INCUBATORS AND BROODERS, QUEEN, BUCK,** eye and Reliable at half manufacturer's price. Don't miss this opportunity, send for list. Bartels, 45 Cortlandt street, New York.

#### TOBACCO

**TOBACCO—SUPERIOR QUALITY LEAF.** 10 LBS. chewing, \$3.50; 10 lbs. smoking, \$3.00; 10 lbs. second-grade smoking, \$2.00. Pipe, \$1.00 value. Free with every ten pounds. Sent C. O. D., plus postage. Farmers Union, Hawesville, Ky.

## DON'T WEAR A TRUSS

### BE COMFORTABLE—

Wear the Brooks Appliance, the modern scientific invention which gives rupture sufferers immediate relief. It has no obnoxious springs, pads. Automatic Air Cushions bind and draw together the broken parts. No salvers or plastering. Circular free. Sent on trial to prove its worth. Beware of imitations. Look for trade-mark bearing portrait and signature of C. E. Brooks which appears on every Appliance. None other genuine. Full information and booklet sent free in plain, sealed envelope. **BROOKS APPLIANCE CO., 213 State St., Marshall, Mich.**



MR. C. E. BROOKS

**Red Power Cultivator**

Does work of 4 men or 1 horse—heavy cultivating or light—fast or slow; cultivates around trees and bushes. Easily operated and extremely simple, sturdy. Automatic lubrication, dust-proof working parts and our own 4-H.P., 4-cycle air-cooled engine. Uses hand or light horse tools.

**M. B. MANUFACTURING CO.** 372 Red St. Milwaukee, Wis.

## Keep the Pullets Growing

(Continued from page 33)

allowance for growth. A certain number of pullets eight to ten weeks of age may have ample space in a house and then be uncomfortably crowded when they double in weight. Summer nights are often hot, poultry houses get terribly heated during the day, and then when the chickens are literally packed therein the results must be bad.

The roosting houses should be weather-tight as regards roofs and rear walls, but they must be freely ventilated and airy. If any sturdy pullets find their sleeping quarters uncomfortable and take up places in the trees, do not disturb them. Here they will at least find cleanliness, coolness and fresh air.

Keep the coops clean and sweet. Remove the droppings frequently. Disinfect at close intervals. Filthy houses do not afford healthful environment and, more, they are quite certain to be infested with mites. Fight the latter with commercial mite-killers or crude oil.

Shade is a necessity, of course. Bare, sun-baked yards or fields are not conducive to comfort and growth. Orchards and cornfields are ideal places for chickens during the warm weather.

The growing ration should be varied, composed of feedstuffs of good quality, and fed liberally. Keep a good growing mash or laying mash before the flock at all times. This means mash in the dry form, not moist; but an occasional meal of moist mash will be relished.

Feed two good meals of scratch grain daily, morning and night. This should be largely composed of wheat, heavy oats, barley and yellow corn. See that an ample supply of succulent green food is available. Keep grit, shell, bone and charcoal in hoppers to which the birds may go at will. Animal food is an absolute necessity and it pays to feed this freely. Beef scraps, fish scraps and meat meal are all good. Milk is especially beneficial, either liquid, semi-solid or powdered.

The water supply is too often neglected, yet nothing is more important. A running stream to which the birds have access is perfectly fine. Dripping faucets which constantly renew the water in troughs underneath are almost ideal. If fountains must be used, have plenty of them and keep them filled. Your flock must have water, lots of it. This drink should be clean and cool. So protect the water supply against contamination and keep it in the shade where it will not become heated. Failure here may be costly.

Continuous comfort—clean, roomy, airy houses—liberty to range—a varied ration fed liberally—clean water always available. These are the price one must pay for big, healthy pullets, which will later shell out the eggs and bring in the dollars.

**THE AMERICAN Railway Ass'n** is making an effort to get Florida citrus shippers to reduce the bulge on boxes. It is claimed that because of the high bulges now used for oranges and grapefruit by many shippers, numerous claims result, causing losses to carriers, shippers and receivers. It is said that even some members of the trade in New York, Boston and Philadelphia have expressed themselves in favor of reducing the bulge.

The bulge pack, when carried to the extreme, is productive of bruised fruit on account of the severe strain on the covers of the boxes, and the corners are easily broken, resulting in the smashing and disarranging of the contents.

Edward Dahill of the Fruit Container Bureau of the Association is in charge of the work and under him there are a number of field men who are now working among Florida growers and shippers and promoting reduced bulges. It is intended also to make a thorough study of packing and loading in general with the view of improving the transportation service.

## Are pipe-smokers less selfish than other people?

A lot of evidence points that way—maybe some reader can explain it

One can't imagine any ordinary citizen going about telling all his friends where he bought the suit that fits him so well or urging upon his acquaintances the merits of a certain make of shoes—but it's different with pipe-smokers and their tobacco.

Most of them, apparently, won't rest until they have shared their favorite tobacco with every smoking friend.

Read this:

Barrington, Ill.

Larus & Bro. Co.,  
Richmond, Va.  
Gentlemen:

I wish to take this opportunity of telling you what I think of Edgeworth. Until some months ago I smoked other brands of pipe tobacco and never was satisfied with any of them—never could get any satisfaction from a pipeful. I just happened upon an advertisement one day of yours and asked you to send me some free samples. And ever since I have been smoking it with great pleasure.

At the present time I am working with the Telephone Company and out of twenty men in the gang, fourteen of them smoke Edgeworth now. They never heard of it until I came into the gang.

Yours with satisfaction,  
Arthur H. Pfum.

We have chosen Mr. Pfum's letter from among hundreds because he is typical of Edgeworth smokers in that, being happy in his own choice of tobacco, he wants everybody within reach to share his happiness! He is a full-fledged member of that Brotherhood of the Pipe—than which there is no greater unorganized organization in the world!

Every day we welcome new members and seldom if ever, we are happy to say, do we lose one.

We are glad to know that Mr. Pfum has created fourteen new Edgeworth smokers, for experience has shown that they will continue to smoke Edgeworth; and every permanent Edgeworth smoker is living proof that we know our job.

Of course, we don't expect every man to like Edgeworth—but fourteen out of twenty is a pretty good showing.

We'd like mightily to have you pass judgment on Edgeworth. Perhaps you can tell us, then, just what it is that causes our tobacco to make friends and hold them.

Edgeworth is sold in various sizes to suit the needs and means of all purchasers. Both Edgeworth Plug Slice and Ready-Rubbed are packed in small, pocket-size packages, in handsome humidor's holding a pound, and also in several handy in-between sizes.

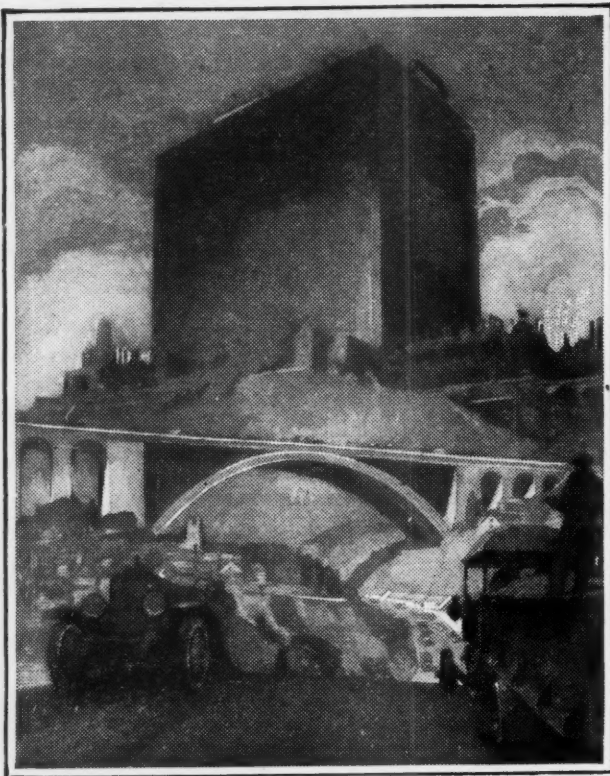
Let us send you a free sample of Edgeworth so that you can decide whether you are one of six or one of fourteen. Address Larus & Brother Company, 83 South 21st Street, Richmond, Va.

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Drawn by C. P. HELCK for The Electric Storage Battery Company

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# Exide

## BATTERIES

## Three Years' Work With Lubricating Oil Emulsions

(Continued from page 30)

spray solution used. Tests from summer applications of this material were carried on during 1923, with much the same results as those obtained during previous seasons. Up to the present time, there has been no indication of injury to apple trees sprayed with the lubricating oil emulsion at two or three per cent strengths where this spray was applied during the dormant season of the tree, or when the buds were beginning to show tip green. A few orchards sprayed during the summer with the regular two per cent emulsions have shown some burn, but this burn was no greater than that which often results from applications of summer strength lime sulphur during periods of high temperature.

From the results of experimental work in Illinois, together with those obtained in the commercial orchard, we feel safe at this time making the following recommendations:

Where orchards are heavily infested with San Jose scale, spray with a three per cent lubricating oil emulsion, making the application either in the fall or in the spring at any time when the temperature is high enough so

tests with these mixtures have been made to date, but no definite recommendations can yet be given concerning them. The present indications are, however, that the so-called cold-mixed lubricating oil emulsions do not give quite as high a kill of scale as the same strength boiled potash-fish-oil soap emulsions. The difference, however, for the same strength emulsions is only slight, varying from one to three per cent, and possibly it will sometimes be of advantage to use the cold-mixed emulsions even though a higher per cent of oil is required in these emulsions. No cooking is required and no soap needs to be added to the mixtures.

During 1923, certain experiments were conducted to test the effect of the lubricating oil emulsions on aphids. From 90 to 95 per cent of all green apple aphids, apple grain aphids and cabbage aphids, thoroughly wet with a two or three per cent emulsion, were killed. The result with the rosy aphid was not quite as good. Apparently a 90 per cent kill of aphids can be obtained by a three per cent oil emulsion applied at the time when the buds show tip green where the operators are careful in making the application to thoroughly wet the tip of the buds. The aphids must be thoroughly wet with the oil emulsion spray



The trees at the left were sprayed with oil emulsion in the spring of 1921. Trees are alive, in fair condition with heavy bloom. The trees at the right were sprayed in the fall of 1920 and spring of 1921, with liquid lime sulphur, 1 to 6 and 1 to 8. Trees are dead from scale injury.

that the mixture will not freeze before drying. If trees are moderately infested, spray with a two per cent emulsion. Peach, plum, pear and apple can, so far as our results to date show, be sprayed during the dormant period with comparative safety.

It is not possible at this time to state whether there will be any injury to the trees from spraying year after year with oil emulsions. At least, we have had no injury to date from dormant sprays applied to any of these fruit trees. The stone fruits should not be sprayed with the lubricating oil emulsion during the summer. At the present time, we cannot make specific recommendations as to the different brands of oils to be used. Oils varying in specific gravity, viscosity and volatility have been used with fairly good results.

The formula which is being recommended and generally used in Illinois for the boiled lubricating oil emulsion is: One gallon of oil, one-fourth gallon of water and one to two pounds of potash fish oil soap, the amount of soap varying with the hardness of the water, some of the alkaline waters requiring the maximum amount of soap. Most of the surface pond water or rain water requires only one pound of soap.

During the late dormant season of 1923, and the present season, a number of tests have been carried on in this state by Dr. L. L. Huber and S. C. Chandler, to try out the effect of the so-called mixed lubricating oil emulsions. In these experiments, the lubricating oil has been emulsified with several different agents, mainly Bordeaux mixture, iron sulphate and calcium caesinate. Some 40 separate

in order to kill them and this means very careful spraying.

**MOST** of the insect pests and fungous diseases of strawberries can be controlled by proper cultural methods.

An infestation of white grubs, the larvae of the May beetle, or June bug, may usually be avoided by not planting on sod land. A cultivated crop should be grown the year previous to setting plants.

Where leaf spot is troublesome, it may be controlled by spraying with Bordeaux. The first application should be made in spring, before blossoming, and the second, just after blossoming.

In sections where the leaf roller is destructive, the application of lead arsenate (one and one-half pounds of powder or three pounds of paste in 50 gallons of spray) at the first appearance of the worms in spring, is effective. Spraying should be done before the worm has protected itself by folding up the leaf. A pressure of at least 100 pounds helps materially to drive the solution into the folds where insects may have begun their attack.

A combined spray of Bordeaux and arsenate of lead applied before and after blossoming and again as soon as new foliage appears after the patch has been renovated in late summer will aid in controlling leaf spot, leaf roller and other insects such as the flea beetle.

Mowing and burning over the bed, followed by the narrowing down of the rows, operations in the renovating process, also are a great help in holding strawberry pests in check.—From Illinois Circular No. 277.